University of Wisconsin-Madison

February 1997 No.377, Revised

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AGRICULTURAL ECONOMICS

STAFF PAPER SERIES

No. 377, Revised **February 1997**

Regional Impacts of Reducing Dairy Price Supports and Removing Milk Marketing Orders in the U.S. Dairy Sector

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EXECUTIVE SUMMARY

1. *An hedonic spatial equilibrium model of the U.S. dairy sector is used to evaluate the aggregate and regional impacts of reducing dairy price supports and removing milk marketing orders.* The model includes 15 U.S. supply/demand regions (including Wisconsin and California) and several exogenous sectors (private stocks, government purchases and stocks, U.S. imports, and U.S. exports). The model solves for farm level blend prices and milk production as well as the price, supply, demand and trade flows for 9 wholesale level dairy products (fluid, soft, frozen, American cheese, Italian cheese, other cheese, butter, nonfat dry milk (NFDM), and a residual manufacturing category (mostly whey products and evaporated/condensed milk)). A unique feature of the model is that it also generates regional component prices for milk fat, protein and carbohydrates (mostly lactose).

2. *Four scenarios are analyzed*: a BASE scenario simulating the 1990 U.S. dairy sector with price supports, milk marketing orders and dairy import quotas; a NO CCC scenario simulating the impacts of reducing 1990 CCC purchase prices to 1990 GATT minimum, world market levels; a NO MMO's simulating the impacts of removing the federal and California milk marketing orders (MMO's) while maintaining 1990 CCC purchase prices; last, a FREE MARKET scenario simulating the impacts of both reducing CCC purchase prices to GATT minimum world market levels and removing the federal and California MMO's.

3. ***NO CCC:*** *All regions except California lose total farm revenues under this scenario. However, Wisconsin dairy producers lose the least in percentage terms (-0.4%) of any region due to lowering the CCC purchase price floors to world market levels.* Aggregate producer surplus ("profits") decline 2.3%; aggregate consumer surplus increases 0.2%; and aggregate costs to taxpayers decline from $367 million to $161 million (-56%).

4. ***NO MMO's:*** *Wisconsin dairy producers gain the most total farm revenue in percentage terms (+5.4%) of any region due to removal of the Federal/State milk marketing orders.* California (+5.3%), West North Central (+2.3%), West Central (+2.1%), and North West (+0.3%) dairy producers also gain total farm revenues under this scenario. The regions projected to gain from removal of the MMO's accounted for roughly 52% of total 1990 milk production and 38% of the 1990 U.S. population. Regions where dairy producers are projected to lose the most farm total revenues include the North East (-6.9%), Middle Atlantic (-5.4%), South Atlantic (-4.0%), South East (-6.0%), Central (-6.0%), East South Central (-6.9%), West South Central (-4.9%), and Mountain (-4.4%). These results suggest strong resistance to terminating MMO's.

5. ***FREE MARKET:*** *The only regions to gain from both the removal of the Federal/State milk marketing orders and lowering the dairy price supports to world market levels are Wisconsin (+4.3%), West North Central (+1.0%), and California (+3.9%).* These regions accounted for 37% of 1990 milk production and only 18% of 1990 U.S. population. Hence, regions where dairy producers are projected to lose the most tend to have more population (hence Congressional clout) than the regions that gain (e.g., North East (-9.1%), Middle Atlantic (-6.7%), South Atlantic (-6.1%), South East (-8.4%), Central (-8.1%), East South Central (-9.5%), West South Central (-6.3%), and Mountain (-5.7%). These results suggest strong support for the *status quo* with respect to U.S. dairy policy on price supports and milk marketing orders.

6. Component Market Impacts: ***Fat is not fat !!!***

a) *The value of fat in butter ranges from 34-38% less than the value of fat used in all other dairy products under the BASE and NO MMO's scenarios*. Lowering the CCC purchase price floors to world market levels increases the butter/all other products fat price differential to 45-46% under the NO CCC and FREE MARKET scenarios. *Under the FREE MARKET scenario, the fall in the value of fat in butter is twice as large as the decline in the value of fat in all other products (i.e., -45% versus -22%).*

b) *Removing the Federal/State milk marketing orders or lowering the CCC dairy price supports increases the value of protein (10-11%)*. Under the FREE MARKET scenario, the value of protein rises 27%.

c) *Under all scenarios evaluated, butter is the only product sold at either the 1990 CCC purchase prices or GATT minimum, world market prices for butter, American cheese and nonfat dry milk*. Hence, these simulations of the 1990 U.S. dairy sector indicate that *fat in butter is clearly in surplus in all scenarios while proteins and fat in all other products are not.* In this context of excess supply of fat in butter, *maintaining price floors for butter above world market prices basically supports the value of fat at the expense of protein values (i.e., the marginal values of fat would fall and the marginal value of proteins would rise with the lowering of the butter price floor to world market levels) and provides considerably more support for fat in butter versus fat in all other products.*

7) Aggregate Welfare and CCC Purchase Impacts: *Consumers and taxpayers generally gain at the expense of producers in all scenarios* representing a change from the BASE scenario. Aggregate producer surplus declines -2.3%, -0.5% and -3.0% under the NO CCC, NO MMO's and FREE MARKET scenarios, respectively while aggregate consumer surplus increases +0.2%, +0.2%, and +0.3%, respectively, under the three scenarios. *Aggregate government expenditures decrease from $367 million in the BASE scenario to $161 million (56% decrease) and $151 (59% decline) due to lowering the CCC purchase prices to world market levels in the NO CCC and FREE MARKET scenarios, respectively. In contrast, elimination of the MMO's has little or no impact on CCC removals.*

8) Conclusions: *Government intervention in the U.S. dairy sector induces sizeable distortions in the implicit, dairy component markets for fats and proteins as well as regional spatial price surfaces*. The direction and magnitude of these impacts varies considerably across regions due to differences in regional supply/demand response, production/consumption levels, and the product composition of the wholesale processing sectors. *Generally, regions projected to gain (or lose the least) due to reduced government intervention in the U.S. dairy sector are smaller in production and population shares than those that are projected to lose, suggesting strong support for the status quo in U.S. dairy policy from a producer's perspective. In contrast, consumers and taxpayers gain at the expense of producers under all scenarios evaluated with reduced government intervention.*

REGIONAL IMPACTS OF REDUCING DAIRY PRICE SUPPORTS AND REMOVING MILK MARKETING ORDERS IN THE U.S. DAIRY SECTOR

I. INTRODUCTION

Government intervention in the U.S. dairy sector is characterized by three main policies: a federal price support program; federal (and state) milk marketing orders; and import quotas on manufactured dairy products under Section 22 of the Agricultural Adjustment Act of 1933. These policies and programs have evolved to address a variety of objectives: to stabilize and preserve the dairy industry during 1930's; to increase production of manufactured dairy products to support the war effort in the 1940's; to protect dairy farmers' incomes, particularly during the cost/price squeeze characterizing the inflationary 1970's; and, in general, to provide for an orderly system of marketing a safe and adequate milk supply. By the late 1970's, these policies resulted in large milk surpluses, growing government purchases, inventories and budgetary burdens which prompted policy debates and economic analyses. Dairy policy changes that began with the 1985 Food Security Act have succeeded in reducing government purchases, inventories and budget outlays as well as, in the opinion of some, exacerbating regional price distortions in the U.S. dairy sector.[1] The continuation of recent trends in regional production, processing and consumption growth (i.e., growth of milk production in the southern and western regions at the expense of the upper midwest and northeastern regions), has contributed to the clamoring by national and regional farm organizations for a re-evaluation and/or removal of dairy price supports (Farm Bureau) and federal milk marketing orders (Minnesota Milk Producers Federation). In light of these developments, the objective of this paper is to provide a thorough economic analysis of the aggregate and regional impacts of reducing dairy price supports to world market levels and removing federal/state milk marketing orders.

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[1] Key elements of the 1985 farm bill included: lowering of price supports; the addition of a trigger price mechanism whereby the Secretary of Agriculture is authorized to lower (raise) the prices support by $0.50 if government purchases are projected to be greater (less) than 5 billion (2.5 billion) pounds on a milk equivalent basis; a dairy termination program to help farmers exit from dairy farming; a milk diversion program funded by a producer levy; and, realignment of the Class I fluid differentials.

II. U.S. DAIRY SECTOR INTERREGIONAL COMPETITION MODEL (IRCM)

A spatial equilibrium model of the U.S. dairy sector developed at the Department of Agricultural Economics, UW-Madison is used to evaluate the aggregate and regional impacts of reducing dairy price supports and removing milk marketing orders. The spatial equilibrium model characterizes the U.S. dairy sector by regional supply and demand curves and links regional markets via transportation costs. Hence, excess supply (i.e., where regional supply is greater than regional consumption) can be shipped to any region with excess demand (i.e., regional demand is greater that regional supply) and will be shipped if the price difference between the two regions is less than or equal to the costs of transporting the product between the two regions. A spatial equilibrium is reached when the price difference between any two regions exactly equals the transportation cost. The spatial equilibrium model, in addition, implicitly values the underlying (or hedonic) characteristics of commodities in this spatial equilibrium. In the present context, the model generates a spatial equilibrium with respect to dairy products with the hedonic characteristics of milk fats, proteins and carbohydrates.

The model includes 15 U.S. supply/demand regions including Wisconsin and California as separate regions (see Table 1 for the definitions of these regions), several additional sectors (net private stocks, net government stocks/removals, U.S. imports, and U.S. exports), farm level milk production and 9 wholesale level dairy products (fluid, soft, frozen, American cheese, Italian cheese, other cheese, butter, nonfat dry milk (NFDM), and a residual manufacturing category (mostly whey products and evaporated/condensed milk): see Table 2 for the definition of these product categories). The model solves for (simulates) regional farm level blend prices and regional milk production as well as regional wholesale level price, supply, demand and trade flows for the nine dairy products. A unique feature of the model is that it also generates regional component prices for milk fat (the values of milkfat in butter as well as the

value of milkfat used in all other products), proteins and carbohydrates (mostly lactose).[2]

The model assumes intermediate run, 3-5 year adjustment responses for both supply and demand functions. Tables 2 and 3 summarize these farm and wholesale level assumptions as well as the 1990 starting values used in the following simulations. Note from Table 3 that the aggregate U.S. (AGG US) milk supply is assumed to be moderately price elastic (i.e., quantity supplied increases 0.56 percent for every one percent change in farm level blend price). In contrast, Table 4 indicates that aggregate wholesale level demand is assumed to be price inelastic (i.e., quantity demanded decreases 0.22 percent for every one percent change in aggregate wholesale level price), thus reflecting the essential inelastic nature of dairy product (and food demand , more generally). This means that quantity demanded is not very sensitive to prices, or, conversely, that prices are quite responsive to changes in quantity demanded at wholesale.

Also note that Table 3 summarizes 1990 regional milk production, farm revenue, and U.S. population shares. These regional shares will facilitate the discussion of regional gains/loses with respect reducing government intervention in the U.S. dairy sector. Similarly, to facilitate understanding the implications of changes at the wholesale level for derived demand impacts at the farm level, Table 4 summarizes dairy product shares of aggregate wholesale revenues. Fluid milk (FLM, 38%), American cheese (ACH, 15%), and Italian cheese (ICH, 13%) account for almost 2/3's of wholesale level revenues in 1990. Hence, changes in these wholesale markets are likely to have relatively larger impacts at the farm level. In contrast, butter (BUT, 4%) and nonfat dry milk (NFT, 3%) the other products supported by CCC purchases accounted for only 7% of aggregate wholesale level revenues. However, the regional distribution of production for many of these products can be quite skewed (e.g., cheese and butter production in Wisconsin versus fluid milk production in the South East). Hence, changes in butter, nonfat

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[2] See Chavas, Cox and Jesse and Selinsky, Cox and Jesse for more details on the U.S. Dairy Sector IRCM and dairy component accounting, respectively.

dry milk, or American cheese regional markets can have sizeable regional farm level impacts as the results below indicate.

III. ALTERNATIVE POLICY SCENARIOS

To simulate the impacts of alternative marketing and/or policy scenarios, we introduce "shocks" to the starting values or structure of the model and then compare the results of these shocks to a base scenario. In this analysis, we use a base scenario that seeks to replicate the actual 1990 U.S. dairy sector. Examples of shocks to the model's starting values include: changing the level of government purchases, imports, exports and/or regional milk supply or commodity supplies/demands; or, changing the farm level blend prices, wholesale level prices, or price floors. Examples of "shocks" to the model's basic structure include: changing the composition of milk or dairy commodities (e.g., less fat and/or more protein in fluid milk or cheese); adding constraints on the spatial price relations (e.g., as in milk marketing orders); changing component by-product recovery rates (e.g., the amount of fat and proteins recovered from the whey associated with cheese processing); changing demand and/or supply response. After introducing these alternative "shocks" to the base model, the model solves for (simulates) all endogenous variables: regional farm level blend and component prices, and milk production; regional wholesale level prices, production and consumption; and the matrix of commodity trade flows between regions. The characteristics of the simulation/scenarios we use to evaluate the impacts of removing dairy price supports and/or milk marketing orders are summarized next.

A) Competitive (FREE MKT) Scenario: GATT Minimum ("World Market") Floor Prices with No Milk Marketing Orders.

The competitive model assumes 1990 regional farm level blend prices and milk production, 1990 aggregate wholesale level prices (adjusted via a marketing margin back to the farm level) and regional wholesale level production (aggregated up from state level data), 1990 private stocks and 1990 dairy

imports. All these data are obtained from USDA sources. In addition, regional projections of wholesale dairy product demand are obtained using aggregate U.S. wholesale demand functions and regional demographic and income data (again, aggregated up from state level data) following Selinsky's M.S. thesis at the UW-Madison. Component yields (i.e., the amount of milk fat, protein and carbohydrates per unit of milk and wholesale dairy product) are obtained from a component accounting exercise that fully allocates 1990 aggregate milk and dairy products production (see Selinsky, Cox and Jesse). The model also required adjustments for component byproduct recovery rates (e.g., whey from cheese processing), on farm milk usage, and technological constraints that prevent perfect substitution of components across commodities in the U.S. dairy industry.[3] In addition, the model is adjusted to reflect California fluid milk standards of identity (with higher nonfat solids content: 3.56% protein (versus 3.32%) and 5.07% carbohydrates (versus 4.73%)) in the California fluid milk market.

With the inclusion of 1990 exports and net government stocks/removals, the competitive model starts from a farm, wholesale and component supply/demand balance that characterized the U.S. dairy sector in 1990. In the competitive, FREE MARKET (as well as NO CCC) scenario, 1990 government stocks/removals and exports are placed in an "endogenous removals" sector (in this case, interpreted as exports) facing perfectly elastic (horizontal) demand curves at 1990 GATT minimum prices for American cheese, butter, and nonfat dry milk (f.o.b. north European ports, adjusted for a transportation differential of

[3] Such constraints are typically associated with specialized plants that can use components in the production of only selected dairy commodities. First, because of the difference in fat composition, the production of fluid milk out of raw milk generates fat byproduct that is typically used only in the production of soft products, frozen products, or butter. Second, butter is a residual commodity using fat surpluses generated by two factors: 1/ the fat in whey associated with cheese production; and 2/ the fat surpluses due to induced production of butter and nonfat dry milk from "reserve fluid milk" that is needed to account for seasonality and uneven weekly bottling schedules in the fluid milk market. Appropriate constraints further restricting the allocation of components across commodities have been added to model to incorporate these specific characteristics.

$10/cwt).[4] Effectively this establishes "world market" floor prices for butter ($51.29/cwt), NFDM ($44.48/cwt), and American cheese ($58.10/cwt). Given that much of 1990's U.S. dairy exports were subsidized, both 1990 exports and government stocks/removals are allowed to be sold at these prices. In all models, these levels are 39 million pounds of American cheese, 404 million pounds of butter, and 100 million pounds of NFDM. The 1990 exports and government stocks/removals for all other products are sold in regional markets at the prevailing wholesale prices as determined by the model solution.[5]

B) Marketing Orders (NO CCC) Scenario: GATT Minimum ("World Market") Floor Prices with Milk Marketing Orders.

This scenario adds both federal as well as California milk marketing orders to the competitive scenario. The federal milk marketing order program involves blend pricing of farm milk, as well as classified pricing rules based on the Minnesota-Wisconsin (MW) price which is assumed to be equivalent to the Wisconsin price in the model. Blend pricing consists in paying dairy farmers a weighted average value based on the fluid and all other manufactured dairy products produced from farm milk in each region. This allows for possible price discrimination across dairy markets, which can raise farm price and benefit farmers in some regions. Blend price equations, defining the price received by farmers in each region, are added in the model. The current federal milk marketing orders also place restrictions on the pricing of fluid milk. First, lower bounds on regional fluid milk prices are imposed, based on the fluid milk price in Wisconsin. More specifically, the fluid milk price in any region is restricted to be at least as large as the Wisconsin fluid milk

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[4] Note, this basically assumes that the U.S. demonstrates"small country effects" with respect to world dairy exports. In 1990, the U.S. accounted for 2.5%, 0.7 %, and 0.6% of world trade in butter, nonfat dry milk powder, and cheese, respectively (4.2%, 0.9% and 1.6%, respectively excluding intra-Euporean Union trade: see USDA, FAS). Hence, the "small country assumption with respect to U.S. dairy exports is reasonable.

[5] Note, the our FREE MARKET scenario still reflects Section 22 imports quotas and all other policies not explicitly modeled. Hence, "free market" is used here to denote reduced government intervention in terms of lowering CCC purchase prices to world market levels and removing MMO's, not free markets in the more general sense of the term.

price, plus a differential of $.21/cwt/100 miles distance from Wisconsin. These constraints were added to the model. Second, the federal milk marketing orders impose a base "Class-I differential" between the price of fluid milk and the value of nonfluid uses of milk in Wisconsin. In 1990, this Class-I differential was $1.25/cwt milk. This differential allows for price discrimination between the fluid milk market and the nonfluid dairy markets and was included in the model as an additional constraint. In addition, California's state level milk marketing order is modelled by specifying the blend price equation in California to incorporate "make allowances" that reduce the value of milk used to manufacture cheese, butter, and nonfat dry milk, and hence reduce the price paid to California dairy farmers for this milk.

This scenario is identical to the competitive, "free market" scenario with the inclusion of the milk marketing order constraints. Hence, 1990 exports and government removals/stocks are allowed to move into the "endogenous removals" (export) sector at GATT minimum, world market floor prices.

C) Price Support (NO MMO's) Scenario: CCC Purchase Price Floors with No Milk Marketing Orders.

The competitive model is modified to allow for "endogenous removals" at 1990 average CCC purchase prices for American cheese, butter and NFDM (adjusted by the "make allowance" to bring the purchase price back to the farm level) rather than at GATT minimum, world prices. Hence, we interpret these removals as CCC purchases in this context. The 1990 "farm level" CCC purchase prices used in this analysis are: American cheese ($97.73/cwt); butter ($94.37/cwt); and NFDM ($72.16/cwt).[6] Hence, the only difference between the competitive, FREE MARKET and price support (NO MMO's) scenarios is the use of CCC versus GATT minimum floor prices. Note that if the CCC "dumps" these removals on the world market, an export subsidy equal to the CCC purchase price minus the world market price is required.

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[6] These are obtained as follows: American cheese: CCC price ($111/cwt) minus $13.27/cwt "make allowance"; butter: average CCC price ($109.25/cwt + $98.25/cwt)/2 = $103.75/cwt minus $9.38/cwt make allowance; NFDM: average CCC price ($79/cwt + $85/cwt)/2 = $82/cwt minus $9.84/cwt "make allowance".

In this case, the taxpayer cost of CCC purchases is reduced to the amount of the export subsidy. This will also be true in the following scenario.

D) BASE Scenario: CCC Purchase Price Floors with Milk Marketing Orders.

The base scenario adds CCC (versus GATT minimum, world market) floor prices as well as federal and California MMO constraints to the competitive model. Hence, the "endogenous removals" sector is interpreted as CCC purchases. This scenario reflects the model's simulation of the actual 1990 U.S. dairy sector and provides a means to "validate" the model by judging how well it replicates key variables (e.g., farm level blend prices and production, wholesale level production and consumption, CCC removals, etc.). It also provides the base against which all other scenarios are compared.

IV. SIMULATION RESULTS

We measure the impacts of alternative simulation/scenarios by comparing their results with those obtained from the base simulation and summarize these impacts in relative (versus absolute) terms. Hence, we measure percentage changes from the **BASE** scenario for key dairy sector parameters such as regional farm level blend prices, production and total revenues, aggregate wholesale level prices, production and consumption, regional component prices and aggregate CCC purchases or exports.[7] Thus, for example, comparing the milk marketing orders (**NO CCC**) to the **BASE** scenario simulates the impacts of reducing CCC support prices to GATT minimum, world market price levels. Similarly, comparing the price support (**NO MMO's**) to the **BASE** scenario simulates the impacts of removing the federal and California milk marketing orders (with CCC floor prices). Comparison of the competitive (**FREE MKT**) with the **BASE** scenario provides a measure of the impacts of both reducing dairy price supports to GATT minimum,

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[7] While our discussion will focus on regional farm level and aggregate wholesale level impacts, detailed regional results for all scenarios (i.e., wholesale prices, production, and consumption, component prices, and trade flows) are available on request.

world market floor prices and removing MMO's.

A) *Validation: BASE versus 1990 Starting Values.*

In order to asses the reasonableness of the U.S. Dairy Sector IRCM, we compare the BASE scenario to the 1990 starting values used in all scenarios. Table 5 summarizes the discrepancy in projected versus 1990 actual milk production and regional shares of aggregate U.S. milk production. With the exception of Wisconsin and California, the aggregate and regional milk production appears to validate quite well. While similar results are found with respect to aggregate farm level blend prices (i.e., 0.9% difference from actual 1990 levels), the regional blend price validation is not quite as robust. With respect to aggregate wholesale production and consumption of the nine dairy products, Table 6 indicates the BASE scenario generated solutions within 8% of 1990 starting values; with the exception of nonfat dry milk, Italian and other cheeses, these differences are less than 3%. As with farm level prices, the wholesale price validation is somewhat less robust due to the inelasticity of dairy product demand which makes it harder to predict prices than quantities.[8]

Clearly, the U.S. Dairy Sector IRCM BASE scenario does not provide an identical replicate of 1990 starting values. This is due to many factors including data limitations (e.g., we had to project regional consumption and basically let the model determine 1990 interregional trade in the absence of better information) and modeling limitations (e.g., deviations from the competitive, hedonic spatial equilibrium assumptions of the conceptual model due to historical/institutional rigidities and incomplete knowledge by dairy sector participants). Despite these limitations, which plague any policy modeling

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[8] Note that the 1990 farm level equivalent, wholesale prices (i.e. wholesale price minus a processor margin) are somewhat arbitrary and are used only as starting values for the simulations. Thus, for example, the 1990 butter price ($83/cwt) is likely a bit low given the farm level, CCC purchase price (i.e., CCC price minus a make allowance) of $94/cwt while the nonfat dry milk price may be a bit too high. The model consistently undervalues both Italian and other cheeses compared to the 1990 starting values used in the simulations. This reflects the implicit component valuation operative in the IRCM and suggests that 1990 observed prices (and markets) do not fully reflect an hedonic spatial equilibrium in the implicit, component markets.

enterprise, we judge the U.S. Dairy Sector IRCM to provide a reasonable and useful characterization of 1990 U.S. dairy sector. The level of regional, commodity, component and potential policy detail are certainly an improvement over extant U.S. dairy sector models.

B) Regional Farm and Aggregate Wholesale Level Impacts of Reducing CCC Purchase Price Supports to World Market Levels (NO CCC).

Table 7 summarizes the impacts of the alterative scenarios with respect to regional farm level total revenues (i.e., blend price times milk production). In the 1990 BASE simulation, total farm revenues in Wisconsin (WIS) and the aggregate U.S. (AGG US) are $3.042 billion and $19.891 billion, respectively. With the reduction in CCC purchase prices in the NO CCC scenario (i.e., keeping the milk marketing orders but with GATT minimum, "world market" floor prices), total farm revenues decline for all regions except California (CA) and decline 0.4% from the BASE scenario for Wisconsin. Note that, along with the Central (C, -0.7%) and East North Central (ENC, 0.6%) regions, Wisconsin experiences the smallest percentage decline of any region. Conversely, regions which suffer the largest percentage declines in total farm revenues due to reducing the price supports are the North East (NE: -5.9%), South Atlantic (SA: -9.6%)), South East (SE: -4.6%), East South Central (ESC: -4.7%), and West South Central (WSC: -3.2%).

These regional total revenue impacts reflect the changes in farm supply and demand that derive from changes in the regional wholesale product and the implicit component markets. Hence, regional processing profiles (i.e., quantities produced of the different wholesale products and the share of regional component production embodied in these products) and regional wholesale and component prices and production impacts basically determine the farm level impacts. Table 6 indicates that the primary wholesale level impacts of reducing the CCC support prices are a sharp decline in the price of butter of -45.5% (roughly from the CCC floor price of $94/cwt in the BASE to the GATT minimum world market floor price of $51/cwt), and a rise in the price of Italian cheese (ICH: +9.6%) and nonfat dry milk (NFT: +12.6%). Wholesale butter production falls -2.5% while consumption rises +4.9% in response to this drop

in the price of butter. Associated with the wholesale price increases, Italian cheese production and consumption decline slightly (both 1.8%) as do nonfat dry milk production and consumption (-4.1% and -4.4%, respectively). These results indicate the close linkages between the nonfat dry milk and butter production (they are often joint products) and cross-market price linkages. Note that wholesale production and consumption changes in quantity are associated with much larger changes in wholesale prices reflecting the essential inelastic nature of wholesale dairy product demand (e.g., prices are very responsive to small changes in quantity, or conversely, quantity demand is not very responsive to prices).

Table 7 further reinforces these results in terms of the implicit component prices for fat and proteins. Table 7 indicates that reducing CCC purchase price floors to GATT minimum world market price floors reduces that value of fat used in butter by 46.4% while raising the value of proteins by +9.7% compared to the BASE scenario. These impacts roughly parallel the wholesale price impacts on butter (-45.5%) and nonfat dry milk (+12.6%) (see Table 6, NO CCC). Note that the value of fat used in all other (non-butter) products declines slightly (-9.8%) while the value of carbohydrates declines sharply (-23.2%). Hence, conversely, the CCC purchase price floors provide strong support to the implicit value of fat used in butter and to a lesser extent, the value of fat used in all other products at the expense of milk proteins.

The ratio of the value of fat in butter relative to the value of fat in all other products from Table 7 further reinforces this result where fat in butter is worth 38% less than fat in all other products in the BASE versus 63% less with the lowering of the CCC purchase price floors. Similarly, the relative value of fat to protein decreases with the reduction of the CCC purchase price floors; i.e., a pound of fat in butter (or all other products) versus a pound of protein decreases from 46% less per pound (12% less for all other products) under the BASE to 73% less (28% less for all other products) under the NO CCC scenario. Conversely, this again indicates that the CCC purchase price floors enhance the value of fats relative to proteins as well as enhancing the value of fat in butter relative to fat in all other products.

In all scenarios butter is the only product sold in the "endogenous removals" (i.e., CCC purchase

or export) sector indicating that butter is in surplus at or above the associated floor prices. Table 8 indicates that the endogenous removals decline 20% from BASE (from 389 million pounds to 313 million pounds) with the reduction of price floors from CCC to world market levels. The associated taxpayer costs decline 56% relative to BASE (from $367 million to $ 161 million), assuming that the CCC does not "dump" this surplus on the world market. Given the prevalence of export subsidies in recent years, it is more likely that the endogenous removals (in excess of fixed government commitments to the military, school lunch programs, etc.) would be dumped on the world market. In this case, BASE CCC/taxpayer expenditures would be $167 million with a butter export subsidy of $43/cwt (i.e., $94/cwt CCC price minus $51/cwt world market price). In contrast, the NO CCC scenario expenditures would be zero (i.e, they were bought and sold at the world market price, assuming no transactions costs). With respect to changes in regional market shares Table 8 indicates that the Middle Atlantic shares drop sharply (i.e, from 12% in the BASE to 0.3%) while those of the West North Central rise sharply (from 8% in the BASE to 24%) due to the reduction in the price floors. The Wisconsin share of these removals declines slightly (from 29% to 24%) while the California share rises slightly (from 13% to 14%).

C) Aggregate and Regional Impacts of Removing Milk Marketing Orders (NO MMO's).

With respect to removing the milk marketing orders while maintaining CCC minimum floor prices, Table 7 indicates that aggregate U.S. total farm revenues decline -0.5% from the $19.891 billion BASE while Wisconsin revenues rise +5.4% from $3.042 billion. Dairy farmers in California (CA, +5.3%) as well as the West North Central (WNC, +2.3%), West Central (WC, +2.1%), and North West (NW, +0.3%) also experience revenue gains from removal of the milk marketing orders. These regions together account for roughly 52% of total 1990 milk production and 38% of the 1990 U.S. population (see Table 3). Conversely, several regions experience farm level total revenue declines of greater than 4%: North East (NE, -6.9%), Middle Atlantic (MA, -5.4%), South Atlantic (SA, -4.0%), South East (SE, -6.0%), Central (C, -6.0%), East South Central (ESC, -6.9%), West South Central (WSC, -4.9%), and Mountain (MOU, -

4.4%). As many of these regions adversely affected by removal of the MMO's have sizable populations and Congressional clout (together they account for 36% of 1990 milk production and 56% of the 1990 U.S. population), these results present a strong argument for expecting the *status quo* with respect to milk marketing orders.

Table 6 indicates that removing milk marketing orders decreases wholesale market fluid prices (-9.4%) and increases fluid production (+1.3%) and consumption (+1.4%) as might be expected when the fluid market price discrimination implicit in the MMO's is removed. The wholesale prices of Italian and other cheese rise (+8.1% and +10%, respectively) as does the price of nonfat dry milk (+13%). Associated with these price increases, wholesale production and consumption decline (Italian cheese: -1.5%; other cheese: -1.5% and -1.2%: nonfat dry milk: -4.2% and -4.6%). Again, note that wholesale production and consumption changes in quantity are associated with much larger changes in wholesale prices reflecting the essential inelastic nature of wholesale dairy product demand.

Table 7 indicates that the impacts of removing the milk marketing orders on component prices are mainly on the price of proteins (+10.8%) and carbohydrates (+28.3%) relative to the BASE scenario. Hence, conversely, the MMO's mainly depress protein and carbohydrate prices (see footnote 6). Note that, in contrast to the NO CCC scenario above, the MMO's do not distort the relative value of fat in butter versus all other products (i.e., the fat in butter is worth 34% less per pound than fat used in all other products in both the BASE and NO MMO's scenarios) or versus the value of protein (i.e., fat in butter is worth 50% less per pound than proteins compared to 46% less in the BASE scenario). However, there is some distortion in the value of fat in all other products relative to proteins (i.e., fat in all other products is worth 23% less per pound than proteins versus 12% less in the BASE scenario), as the protein price rises about 11% in the absence of the MMO's.

Table 8 summarizes the level and regional sourcing of endogenous removals (in this scenario, interpreted as CCC removals at CCC purchase prices). Note that the level of CCC removals is the same as

BASE removals. Hence, this analysis indicates removing the MMO's has minimal impacts on CCC purchases. With respect to changes in regional market shares of these removals the Middle Atlantic shares drop slightly (from 12% in the BASE to 8%) while those of the West North Central double (from 8% in the BASE to 16%). Wisconsin share of CCC removals is unchanged (at 28%-29%) while the California share increases slightly (from 13% to 15%) with the removal of the MMO's.

D) Regional Impacts of Reducing Both CCC Purchase Prices to World Market Levels and Removing Milk Marketing Orders (FREE MARKET).

Combining the reduction in CCC prices to GATT minimum world market prices and removing the milk marketing orders, the FREE MARKET scenario yields results that are a combination of the previous two: aggregate U.S. farm revenues decline (AGG US, -2.1%) but rise in Wisconsin (WIS, +4.3%), California (CA, +3.9%), and the West North Central (WNC, +1.0%). These regions account for 39% of 1990 milk production but only 16% of the 1990 U.S. population. All other regions are simulated to have negative farm level total revenue impacts under the FREE MARKET scenario and some of these losses are quite large (e.g., greater that 5%: North East (NE, -9.1%), Middle Atlantic (MA, -6.7%), South Atlantic (SA, -6.1%), South East (SE, -8.4%), Central (C, -8.1%), East South Central (ESC, -9.5%), West South Central (WSC, -6.3%), and Mountain (MOU, -5.7%). Hence, once again, regions where dairy producers are projected to lose farm level total revenues have more population (hence Congressional clout) than the regions who gain. These results provide some motivation for expecting the *status quo* with respect to U.S. dairy policy.

Wholesale level impacts of the FREE MARKET scenario also reflect a combination reducing CCC purchase prices and removing MMO's. As before, the largest wholesale level price impacts are on fluid milk (FLM, -4.6%), Italian cheese (ICH, +10.4%), butter (BUT, -45.2%), residual manufacturing (mostly evaporated/condensed and whey products: MFG, +9.8%), and nonfat dry milk (NFT: +28%). Wholesale production and consumption impacts are relatively modest (e.g., less than 2%) with the

exception of those products experiencing relatively larger price impacts: Italian cheese (-2%), butter (-4.1% and +4.8%, respectively), residual manufacturing (-3.6% and -3.7% declines, respectively) and nonfat dry milk (-9.1% and -9.9% declines, respectively). Again, the regional wholesale processing profiles weight these wholesale price and production impacts to generate the derived demand impacts on farm level total revenues.

Table 7 indicates that the FREE MARKET scenario has major impacts on all component prices. In particular, reducing the CCC purchase price floors and removing MMO's would decrease the value of fat in butter (-45.1%) and in all other products (-21.5%) as well as the value of carbohydrates (-30.3%) while increasing the value of proteins (+26.6%) relative to the BASE scenario. The value of fat in butter relative to the value of fat in all other products decreases (57% less compared to 38% less in the BASE scenario) mainly due to the reduction in the CCC purchase price floors (recall that the 45% decline in the value of fat in butter primarily reflects the difference in CCC versus GATT minimum prices for butter, i.e., $93.37/cwt versus $51.29/cwt, a 45.6% decline). The value of fat in butter relative to the value of protein declines from 46% less value per unit in the BASE to 76% less value per unit under the FREE MARKET scenario. This mainly reflects the reinforcing effects of removing the CCC purchase price floors and MMO's on protein prices (+10% and +11%, respectively, and a +27% increase in protein value under the FREE MARKET scenario). Similarly, since the value of fat in all other products falls 22% while the value of protein rises 27% compared to the BASE scenario, the value of fat in all other products relative to the value of protein per pound falls under the FREE MARKET scenario (from 12% less value per pound than protein under the BASE to 46% less).

Thus, these results indicate that the CCC purchase price floors and MMO's jointly increase the value of fat (both in butter (+45%) and in all other products (+22%)), decrease the value of proteins (-27%), and increase the value of fat in butter relative to fat in other products as well is increase the value of fats relative to proteins. Given the surplus of fat relative to proteins that characterized 1990 (as well as the

more recent) U.S. dairy sector one must question whether the government involvement in the dairy sector, as characterized by this model and analysis, is in the long run interests of dairy producers, consumers and taxpayers.

V) SUMMARY AND CONCLUSIONS

An hedonic spatial equilibrium model of the U.S. dairy sector is used to simulate the regional impacts of reducing U.S. dairy price supports on butter, nonfat dry milk,and cheddar cheese to world market levels and removing the federal/state milk marketing orders relative to a 1990 BASE scenario. The model includes 15 U.S. supply/demand regions (including Wisconsin and California) and several exogenous sectors (private stocks, government purchases and stocks, U.S. imports, and U.S. exports). The model solves for farm level blend prices and milk production as well as the price, supply, demand and trade flows for 9 wholesale level dairy products (fluid, soft, frozen, American cheese, Italian cheese, other cheese, butter, nonfat dry milk (NFDM), and a residual manufacturing category (mostly whey products and evaporated/condensed milk)). A unique feature of the model is that it also generates regional component prices for milk fat, protein and carbohydrates.

Four scenarios are analyzed: a BASE scenario simulating the 1990 U.S. dairy sector with milk marketing orders, the price support program, and dairy import quotas; a NO CCC scenario simulating the impacts of reducing 1990 CCC purchase price floors to 1990 GATT minimum, world market levels; a NO MMO's simulating the impacts of removing the federal and California milk marketing orders (MMO's) while maintaining 1990 CCC purchase price floors; last, a FREE MARKET scenario simulating the impacts of both reducing CCC purchase price floors to GATT minimum world market levels and removing the federal and California MMO's.

Lowering CCC purchase prices floors to world market levels causes all regions lose total farm revenues (with the exception of California), but there are considerable regional differences in these losses.

Aggregate producer surplus ("profits") decline 2.3%; aggregate consumer surplus increases 0.2%; and aggregate costs to taxpayers decline from $367 million to $161 million (-56%). The regions projected to gain from removal of the federal/state MMO's (California, North West, West North Central, West Central, and Wisconsin) accounted for roughly 52% of total 1990 milk production and 38% of the 1990 U.S. population. Again, considerable regional differences in gains/losses were found. These results suggests strong resistance to terminating MMO's. The only regions to gain from the removal of the Federal/State milk marketing orders and lowering the dairy price supports to world market levels are Wisconsin, West North Central, and California. These regions accounted for 37% of 1990 milk production and only 18% of 1990 U.S. population. Hence, regions where dairy producers are projected to lose the most (in percentage terms) tend to have more population (hence Congressional clout) than the regions who gain. Again, these results suggest strong support for the *status quo* with respect to U.S. dairy policy on price supports and milk marketing orders from a dairy producer perspective.

As to aggregate welfare effects, consumers and taxpayers generally gain at the expense of producers in all scenarios. Aggregate producer surplus declines 2.3%, 0.5% and 3.0% under the NO CCC, NO MMO's and FREE MARKET scenarios, respectively while aggregate consumer surplus increases 0.2%, 0.2%, and 0.3%, respectively. Aggregate government expenditures decrease from $367 million in the BASE scenario to $161 million (56% decrease) and $151 (59% decline) due to lowering the CCC purchase prices to world market levels in the NO CCC and FREE MARKET scenarios, respectively. In contrast, elimination of the MMO's has little or no impacts on CCC removals.

The simulation results indicate that both the federal price supports and the MMO's induce considerable distortions to the aggregate and regional implicit markets for dairy components. The value of fat in butter ranges from 34-38% less than the value of fat used in all other dairy products under the BASE and NO MMO's scenarios. Lowering the CCC purchase price floors to world market levels increases the butter/all other products fat price differential to 45-46% under the NO CCC and FREE MARKET

scenarios. Under the FREE MARKET scenario, the fall in the value of fat in butter is twice as large as the decline in the value of fat in all other products (i.e., -45% versus -22%). Similarly, removing the Federal/State milk marketing orders or lowering the CCC dairy price supports increases the value of protein (10-11%). Under the FREE MARKET scenario, the value of protein rises 27%.

Under all scenarios evaluated, butter is the only product sold at either the 1990 CCC purchase prices or GATT minimum, world market prices for butter, American cheese and nonfat dry milk. Hence, these simulations of the 1990 U.S. dairy sector indicate that fat in butter is clearly in surplus in all scenarios while proteins and fat in all other products are not. In this context of excess supply of fat in butter, maintaining price floors for butter above world market prices basically supports the value of fat at the expense of protein values (i.e., the marginal values of fat would fall and the marginal value of proteins would rise with the lowering of the butter price floor to world market levels) and provides considerably more support for fat in butter versus fat in all other products. The impacts of these implicit, dairy component market distortions vary considerably across regions due to differences in supply/demand response, production/consumption levels, and the product composition of the wholesale processing sector. Generally, regions projected to gain (or lose the least) due to reduced government intervention in the U.S. dairy sector are smaller in production and population shares than those that are projected to lose, suggesting strong support for the *status quo* in U.S. dairy policy from a producer's perspective. In contrast, consumers and taxpayers gain at the expense of producers under all scenarios evaluated with reduced government intervention.

Table 1. Producing and Consuming Regions of Fluid and Manufactured Dairy Products in the U.S. Dairy Sector IRCM.

1. **California (CA)**
2. **Central (C):** Kentucky, Tennessee
3. **East North Central (ENC):** Illinois, Indiana, Michigan, Ohio
4. **East South Central (ESC):** Alabama, Arkansas, Louisiana, Mississippi
5. **Middle-Atlantic (MA):** New York, New Jersey, Pennsylvania
6. **Mountain (MOU):** Arizona, Colorado, Montana, Nevada, Utah, Wyoming
7. **North East (NE):** Connecticut, Massachusetts, Maine, New Hampshire, Rhode Island, Vermont
8. **North West (NW):** Idaho, Oregon, Washington
9. **Other (OTH):** Alaska, Hawaii
10. **South Atlantic (SA):** District of Columbia, Delaware, Maryland, Virginia, West Virginia
11. **South East (SE):** Florida, Georgia, North Carolina, South Carolina
12. **West South Central (WSC):** New Mexico, Oklahoma, Texas
13. **West Central (WC):** Iowa, Kansas, Missouri, Nebraska
14. **Wisconsin (WIS)**
15. **West North Central (WNC):** Minnesota, North Dakota, South Dakota
16. **Government (GOV):** Net Government Stocks and Disposals.
17. **Private (PRI):** Net Private Stocks.
18. **Exports to Rest of World (US-ROW).**
19. **Imports (ROW-US).**

Table 2. Nine Categories of Fluid and Manufactured Dairy Products in the U.S. Dairy Sector.

CONSUMER DAIRY PRODUCTS	
Fluid (FLM):	Beverage fluid milk including regular and flavored milk (whole, 2%, 1%, skim) and buttermilk.
Soft Products (SOF):	Cream (Half and Half, heavy and light), sour cream, yogurt, eggnog, cottage cheese.
Frozen Products (FZN):	Ice-cream, ice-milk, sherbet, frozen dairy mix and mellorine.
INDUSTRIAL DAIRY PRODUCTS	
Butter (BUT):	Butter.
American Cheese (ACH):	American, Cheddar, Colby, Monterey and processed American cheese.
Italian Cheese (ICH):	Mozzarella, Provolone, Parmesan, Romano and Ricotta.
Other Cheese (OCH):	Swiss, Edam, Gouda, Brick, Muenster, Gruyere, cream cheese and all other cheeses.
Nonfat Dry Milk (NFT):	Nonfat dry milk.
All Other Mfg (MFG):	Canned and bulk whole milk and skim milk, dry whole

Table 3. Summary of Farm Level Elasticity, Price and Production Assumptions with 1990 Regional Production, Revenue and Population Shares.

	FARM SUPPLY ELASTICITY	1990 BLEND PRICES ($/cwt)	1990 MILK PROD'N (million lbs)	1990 FARM REVENUE (million $)	1990 REGIONAL PROD'N SHARE	1990 REGIONAL REVENUE SHARE	1990 REGIONAL POPULATION SHARE
North East	0.28	14.62	4,235	619	0.029	0.031	0.053
Mid-Atlantic	0.61	14.79	21,089	3,119	0.144	0.156	0.152
South Atlantic	0.11	14.91	3,709	553	0.025	0.028	0.057
South East	0.65	16.20	5,853	948	0.040	0.047	0.120
Central	1.44	14.50	4,390	637	0.030	0.032	0.035
E.South Cen	0.57	15.30	2,990	457	0.020	0.023	0.053
W.South Cen	0.68	14.40	8,192	1,180	0.056	0.059	0.048
E.North Cen	0.99	13.81	14,617	2,019	0.100	0.101	0.150
Wisconsin	0.15	13.47	24,059	3,241	0.165	0.162	0.020
W.North Cen	0.25	13.13	12,646	1,660	0.087	0.083	0.023
West Central	1.44	13.36	9,821	1,312	0.067	0.065	0.088
North West	0.52	12.92	8,833	1,141	0.060	0.057	0.035
Mountain	0.46	13.78	4,953	683	0.034	0.034	0.045
California	0.34	12.02	20,660	2,483	0.141	0.124	0.120
TOTAL U.S.	0.555	13.81	146,048	20,052	1.000	1.000	247.1

Table 4. Summary of Wholesale Level Elasticity, Price, Production and Consumption Assumptions with 1990 Product Shares of Total Wholesale Revenues.

	WHOLESALE DEMAND ELASTICITY Cox, et.al.	RETAIL DEMAND ELASTICITY Huang	RETAIL DEMAND ELASTICITY George&King	1990 WHOLESALE PRICES ($/cwt)	1990 WHOLESALE PROD'N (mil lbs)	1990 WHOLESALE CONSUMP (mil lbs)	1990 WHOLESALE REVENUE SHARE
FLUID	-0.144	-0.26	-0.35	14.09	55,387	54,387	0.376
SOFT	-0.420	--	--	29.20	3,755	3,747	0.054
AMER CH	-0.160	-0.33	-0.45	112.00	2,894	2,749	0.151
ITAL CH	-0.251	--	--	121.00	2,207	2,173	0.129
OTHR CH	-0.155	--	--	122.00	960	1,186	0.071
BUTTER	-0.093	-0.17	-0.65	83.10	1,302	906	0.037
FROZEN	-0.327	-0.12	-0.53	24.05	7,220	7,134	0.084
RESID MFG	-0.413	-0.83	-0.32	40.03	3,652	3,407	0.067
NFDM	-0.449	--	--	90.00	879	708	0.031
AGGREGATE	-0.217						$20,382[1]

1) Million $.

Table 5. Farm Level Validation: Comparison of BASE Scenario to 1990 Actual Values.

TOTAL U.S.	**146,048**	**1.000**	145,861	**1.000**	-0.1%	--	**13.81**	13.64	**-1.2%**

Table 6. Wholesale Level Validation: Comparison of BASE Scenario to 1990 Actual Values.

AMER CH	**112.00**	122.22	**9.1%**	**2,894**	2,816	**-2.7%**	**2,749**	2,709	**-1.5%**
ITAL CH	**121.00**	96.31	**-20.4%**	**2,207**	2,281	**3.4%**	**2,173**	2,284	**5.1%**
OTHR CH	**122.00**	96.12	**-21.2%**	**960**	994	**3.5%**	**1,186**	1,225	**3.3%**
BUTTER	**83.10**	94.57	**13.8%**	**1,302**	1,276	**-2.0%**	**906**	894	**-1.3%**
FROZEN	**24.05**	23.78	**-1.1%**	**7,220**	7,180	**-0.6%**	**7,134**	7,158	**0.3%**
RESID MFG	**40.03**	37.31	**-6.8%**	**3,652**	3,537	**-3.2%**	**3,407**	3,502	**2.8%**
NFDM	**90.00**	75.69	**-15.9%**	**879**	828	**-5.9%**	**708**	759	**7.1%**

Table 7. Regional Farm Level Total Revenues Impacts: Percentage Changes from BASE Scenario Under Alternative Simulations.

REGION	1990 BASE	NO CCC	NO MMO's	FREE MARKET
North East	$632	-5.9%	-6.9%	-9.1%
Mid-Atlantic	**$2,973**	**-2.2%**	**-5.4%**	**-6.7%**
South Atlantic	$541	-9.6%	-4.0%	-6.1%
South East	$932	-4.6%	-6.0%	-8.4%
Central	$648	-0.7%	-6.0%	-8.1%
E. South Cen	$471	-4.7%	-6.9%	-9.5%
W. South Cen	**$1,209**	**-3.2%**	**-4.9%**	**-6.3**
E. North Cen	$1,983	-0.6%	-1.4%	-3.3%
Wisconsin	**$3,042**	**-0.4%**	**5.4%**	**4.3%**
W. North Cen	$1,646	-1.3%	2.3%	1.0%
West Central	$1,308	-0.9%	2.1%	-0.2%
North West	$1,157	-1.3%	0.3%	-1.1%
Mountain	$687	-2.1%	-4.4%	-5.7%
California	**$2,662**	**0.0%**	**5.3%**	**3.9%**
TOTAL U.S.	**$19,891**	**-1.8%**	**-0.5%**	**-2.1%**

Table 8. Aggregate Wholesale Price, Production and Consumption Impacts: Percentage Changes from BASE Scenario Under Alternative Simulations.

WHOLESALE PRICES ($/cwt).

	1990 BASE	NO CCC	NO MMO's	FREE MARKET
FLUID	14.07	1.9%	-9.4%	-4.6%
SOFT	$28.85	-0.9%	3.5%	-1.1%
AMER CH	**$122.22**	**-2.8%**	**2.7%**	**2.1%**
ITAL CH	$96.31	9.6%	8.1%	10.4%
OTHR CH	$96.12	1.4%	10.0%	7.2%
BUTTER	**$94.57**	**-45.5%**	**0.0%**	**-45.2%**
FROZEN	$23.78	-3.5%	4.6%	-3.6%
RESID MFG	$37.31	1.8%	4.9%	9.8%
NFDM	**$75.69**	**12.6%**	**13.0%**	**28.0%**

WHOLESALE PRODUCTION (million pounds).

	1990 BASE	NO CCC	NO MMO's\	FREE MARKET
FLUID	54,785	-0.3%	1.3%	0.6%
SOFT	3,777	0.4%	-1.4%	0.5%
AMER CH	**2,816**	**0.5%**	**-0.5%**	**-0.4%**
ITAL CH	2,281	-1.8%	-1.5%	-2.0%
OTHR CH	994	-0.2%	-1.5%	-1.1%
BUTTER	**1,276**	**-2.5%**	**-0.0%**	**-4.1%**
FROZEN	7,180	1.1%	-1.5%	1.2%
RESID MFG	3,537	-0.6%	-1.8%	-3.6%
NFDM	**828**	**-4.1%**	**-4.2%**	**-9.1%**

WHOLESALE CONSUMPTION (million pounds).

	1990 BASE	NO CCC	NO MMO's	FREE MARKET
FLUID	54,391	-0.3%	1.4%	0.7%
SOFT	3,765	0.4%	-1.5%	0.5%
AMER CH	**2,709**	**0.5%**	**-0.5%**	**-0.4%**
ITAL CH	2,284	-1.8%	-1.5%	-2.0%
OTHR CH	1,225	-0.2%	-1.2%	-0.9%
BUTTER	**894**	**4.9%**	**0.0%**	**4.8%**
FROZEN	7,158	1.1%	-1.5%	1.2%
RESID MFG	3,502	-0.7%	-1.8%	-3.7%
NFDM	**759**	**-4.4%**	**-4.6%**	**-9.9%**

Table 9. Aggregate Wholesale Component Price Impacts: Percentage Changes from BASE Scenario Under Alternative Simulations.

COMPONENT PRICES[1]	1990 BASE	NO CCC	NO MMO's	FREE MARKET
FAT IN BUTTER	$111	$60 (-46%)	$114 (+ 3%)	$61 (-45%)
FAT IN ALL OTHER PRODUCTS	$180	$162 (-10%)	$174 (- 3%)	$141 (-22%)
PROTEINS	$205	$225 (+ 10%)	$227 (+ 11%)	$259 (+ 27%)
CARBOHYDRATES	$8	$6 (-23%)	$5 (-28%)	$5 (-30%)
COMPONENT PRICE RATIOS (%)[2]				
BUTTER/ALL OTHER PRODUCTS	-38%	-63%	-34%	-57%
PROTEIN/BUTTER FAT	+ 84%	+ 276%	+ 99%	+ 325%
PROTEIN/ALL OTHER FAT	+ 14%	+ 38%	+ 31%	+ 84%

1) Component prices are $/cwt with percentage change from the BASE scenario in parenthesis.

2) The component price ratios express the numerator as a percentage change from the denominator for each scenario. For example, an additional unit of fat in butter is worth 38% less than an additional unit of fat in all other products under the BASE scenario, and 63% less under NO CCC. Similarly, an additional unit of protein is worth 84% more than an additional unit of fat in butter under the BASE scenario.

Table 10. Summary of Regional Butter Removals (CCC Purchases or Export Market) Under Alternative Scenarios.

REGIONAL MARKET SHARES OF BUTTER REMOVALS:

REGION	1990 BASE	NO CCC	NO MMO's	FREE MARKET
NE	6.7%	7.7%	2.6%	--
MA	**11.8%**	**0.3%**	**8.0%**	--
SA	--	--	-	--
SE	2.1%	--	1.3%	--
C	1.0%	2.6%	1.0%	--
ESC	1.3%	2.2%	2.6%	2.0%
WSC	**13.1%**	**11.5%**	**13.6%**	**16.3%**
ENC	--	--	--	--
WIS	**28.5%**	**23.6%**	**27.5%**	**30.6%**
WNC	**8.2%**	**24.3%**	**15.9%**	**19.4%**
WC	5.4%	5.1%	5.1%	6.1%
NW	8.0%	8.3%	6.9%	8.5%
MOU	1.0%	--	--	--
CA	**12.9%**	**14.4%**	**15.4%**	**17.0%**

AGGREGATE U.S. BUTTER REMOVALS:

	1990 BASE[1]	NO CCC[2]	NO MMO's[1]	FREE MARKET[2]
Million lbs.	389	313	389	294
% chg (BASE)		-19.5%	--	-24.4%
Million $	367	161	367	151
% chg (BASE)		-56.3%	--	-58.9%

1) CCC Butter Purchase Price ($/cwt): $94
2) GATT Minimum Butter Price ($/cwt): $51

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