The Role of Domestic Market Price Regulations in International Trade: the Case of Dairy Policy in the United States

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Comments welcome

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Introduction

Government policy takes many and varied forms when applied to farm commodity markets. However, distinct policies may achieve similar effects. This paper considers the extent to which domestic market price regulations may affect imports and exports in addition to (or in absence of) the effects of explicit border measures. In particular, the paper investigates how U.S. domestic dairy policy is similar to or different from explicit state trading in commodities which also may substitute for or supplement explicit and transparent border measures.

Dairy Policy is almost always inordinately complex. For many years U.S. dairy policy has comprised six elements: (1) purchases of manufactured dairy products at minimum prices (the price support); (2) producer assessments (used, in part, to fund the purchase of supported products); (3) domestic disposal of government-controlled stocks of dairy products (domestic food donations or low price sales, international food aid, government sale of stocks at below cost to foreign markets); (4) explicit price subsidy for selected export sales; (5) explicit import barriers (prior to the Uruguay Round these were import quotas, after the Uruguay Round they are tariff rate quotas with generally prohibitive tariffs for the above quota quantity; and, (6) marketing orders that regulate milk prices by end use, apply price pooling for producers and regulate milk shipments regionally, including some state government regulations. In addition, from time to time there have been supply control mechanisms in place, such as the whole herd buy-out program in the middle 1980s or the assessment programs in the 1980s and 1990s.

Three recent policy shifts have changed (or are changing) various aspects of this policy system. The Uruguay Round agreement caused the elimination of absolute import quotas and required an expansion in the quantity of some of the most restricted dairy product imports. This agreement also mandated the reduction of quantities of dairy products that are eligible for explicit export subsidy.

The Federal Agricultural Improvement and Reform (FAIR) Act of 1996 eliminated immediately the producer assessment and mandated the elimination of the price support program by the end of 1999. This will also mean the end of government purchase and stockholding of dairy products. The dairy support price declined dramatically throughout the 1980s and has had relatively little effect on markets in the 1990s. Thus the elimination of the price support program was to some extent symbolic.

Finally, the FAIR Act mandated some modification of the Federal Milk Marketing Order (FMMO) system and seemed to stimulate the consideration of additional reforms. The USDA was required to consolidate the number of regional orders from the more than 30 that existed in 1996 to between 10 and 14. As a part of the change in the FMMO system, the USDA was also encouraged to make other changes as appropriate. In particular USDA was authorized explicitly to consider changing the way the base price or basic formula price was determined and to examine changing the geographic pattern of price discrimination by end use. In addition, there were explicit provisions that invited California to join the FMMO system under conditions that might be viewed as more favorable to producers there.[1]

[1] The U.S. implementation of the Uruguay Round agricultural provisions is discussed in Tangermann et al. (1997) and Sumner and Tangermann 1998 among many other places. Blaney, Miller and Stillman (1995) provide a discussion of the U.S. dairy industry and policy prior to the FAIR Act. Jesse and Cropp (1996) provide a detailed discussion of the dairy provisions of the FAIR Act. See also Sumner and Cox (1998) upon which parts of this discussion is based. The FMMO reform is still underway and the best source of up to date information and analysis is found on the USDA Milk marketing division world wide web page (www.ams.usda.gov/dairy/reform).

This paper examines the current and proposed dairy policy schemes in the United States in the context of international trade flows, and trade agreements, disputes and negotiations. In particular, I attempt to isolate those aspects of the system that may provide implicit trade barriers or export assistance in much the same way that state trading enterprises may be used to affect international trade.

1.0 Trade issues

We may consider trade effects of U.S. dairy policy in several categories. First is explicit trade barriers. This has long been the most important feature of U.S. dairy policy in the sense that the largest share of subsidy has been associated with the trade barriers (OECD, Sumner and Hart, 1997). The United States has a strict set of tariff-rate quotas (TRQs), which severely limit imports. For many years, the system has allocated quota imports to a traditional set of suppliers with the quota rents taken by the exporter. Access improved with the Uruguay Round, but U.S. prices for many dairy products remain well above prices in international markets most of the time. There seems to be little hidden or implicit about these TRQs and relatively little state trading aspects associated with TRQ administration by the United States. This last issue will be discussed more fully below.

The United States explicitly declared its export programs for dairy to the WTO in accordance with Uruguay Round rules. The main item here is the Dairy Export Incentive Program (DEIP). The export sales by the Commodity Credit Corporation have been minor in recent years and being phased out altogether as the price support program ends in 1999.

Other explicit export programs apply to export promotion (marketing assistance for trade shows, advertising etc.), export credit guarantees and food aid. These are not major items in

terms of export subsidy in general and the latter two have been less important for dairy relative to some other commodities.

After setting out the context of dairy policy more fully, this paper will focus most of the attention on the implicit trade barrier or export subsidy created by domestic support and regulations related to dairy production in the United States. As discussed more fully below, several aspects of these rules may have trade implications. The price support program (which is being phased out) tends to encourage import and discourage export of dairy products. End-use price discrimination lowers U.S. prices of the dairy products most likely to be traded internationally. Price pooling increases milk production and this reduces the scope for imports and raises the potential for exports. Regulations on the movement of milk and some milk products within the United States cause the industry as a whole to be less efficient, but the implications for trade are not straightforward (at least not yet straightforward to me). Product definitions (quality standards) for marketing orders and for sanitation may make import more complex. California, for example, has different standards for fluid milk than other parts of the United States and this may make movement of already packaged fluid milk across state lines a bit more complex. Finally, as described fully below, the California milk marketing order has rules that allow lower prices paid for milk used for selected products if those products are exported. This scheme seems a pretty clear example of an explicit trade subsidy provided through a domestic marketing program.

2. Current dairy policy instruments and recent changes

2.1 Price support and border policy

The price support for milk has been implemented with a government purchase program for manufactured dairy products. The USDA promises to purchase butter, non-fat dry milk

(NDM), and American cheese from processors at prices calculated to ensure that the farm price of milk used for the manufacture of those products will generally remain above the legislated support price. The evolution of the dairy price support program over the past two decades is shown in Table 1. The support price is shown and the degree of effective support and market intervention is indicated by the percentage of dairy production acquired by the government through price support program operation. Note the price support has fallen dramatically after rising in the late 1970s and early 1980s. Further, the price support program has had little market impact in the recent decade.

In the Food, Agriculture, Conservation and Trade (FACT) Act of 1990, a tax on milk production was included in the price support program to lower milk output and offset dairy program budget outlays. Under this program farmers paid a per-unit assessment that has averaged about 11 cents per hundredweight (a little under one percent of the market price). Assessments were refunded to farms whose milk output did not increase from one year to the next, but the assessment rate was then adjusted upward on the paying farms to make up for the lost government revenue. Under the FAIR Act the dairy support price is being phased down and will be eliminated by the year 2000 (at which time it is replaced with a "recourse" loan program). However, the assessments on dairy producers were eliminated immediately. Producer representatives considered elimination of the price support, which had not provided much "support" recently, a reasonable price to pay for eliminating the assessment that cost producers close to $300 million per year

As noted above, explicit trade barriers have long been a fundamental feature of U.S. dairy policy. In general, imports of dairy products in the United States have been limited to about 2 percent of production. The import barriers allow the domestic prices of milk and milk products

to remain well above the prices for traded products in world markets. This raises the overall level of prices and makes price discrimination policies feasible. On July 1, 1995, as a part of the Uruguay Round Agricultural Agreement, the system of absolute quotas gave way to a system of tariff-rate quotas. However, the second-tier tariffs that limit over-quota imports remain prohibitively high; therefore, the effects of the TRQs remain the same as the absolute quotas that they replaced. The Uruguay Round agreement also provides for a gradual increase in the quantity of dairy product imports into the United States under the TRQs. This provision will allow for a gradual increase in import access into the U.S. dairy market over the next 5 years. Despite the fact that trade barriers are the most significant feature of U.S. dairy policy, no serious trade policy reform was contemplated in the policy discussions leading to the FAIR Act. The nature of import policy in the last few years is shown in Table 2 [not available in this draft].

Subsidized exports, along with donations to domestic food programs and international food aid, have long been used to dispose of stocks of dairy products acquired under the price support program. Subsidized exports have been considered a market for U.S. dairy products that does not disrupt domestic commercial sales. In addition to the disposal of government stocks, since 1989 the Dairy Export Incentive Program (DEIP) has provided explicit price subsidies for commercial export of dairy product (Table 3).

The FAIR Act extends and fully funds DEIP through 2002. In part because of sensitivity over the Uruguay Round agreement provision, the United States did not establish new producer financed dairy export schemes following the Uruguay Round. However, the FAIR Act authorized USDA to assist in forming export-trading companies and the National Dairy Board was allowed to use funds for export market development. The new U.S. Dairy Export Council does not itself export with subsidy but is funded in part by federal export promotion funds.

The Uruguay Round agreement did provide for an active role restricting the use of export credit programs, food aid or promotion. Both promotion and credit programs were explicitly excluded from direct export subsidy commitments in the Uruguay Round. With the current financial crisis in Asia, and other places credit guarantee programs have had an expanded subsidy element and increased visibility. The Uruguay Round put off dealing with export credits in general by shifting consideration to the OECD. Table 4 provides data on the use of food aid, credit programs and export promotion for dairy exports from the United States.

2.1 Marketing orders

Marketing orders in the United States are regional in their implementation. Further, some markets are not covered by federal marketing orders for milk. State or regions not covered by a federal milk marketing order either have a state order or no marketing order. All federal milk marketing orders, and the major state milk marketing orders, establish specific minimum prices that must be paid for milk according to its end-use class (classified pricing). Federal marketing orders operate with at least three classes of milk designated by end use. These classes provide separate markets and pricing for milk sold for fluid use and for manufactured products such as yogurt, cheese, butter or NDM. Marketing orders also establish pool pricing for farms such that individual farmers receive a weighted average price of milk sold in their marketing order. Federal milk marketing orders calculate a separate pool price for all milk under each of the regional orders (Neff and Plato, 1995).

Each marketing order regulates milk within a geographically limited market. The relationship of prices among orders is determined, in part, by the formula used to set minimum prices in the orders themselves. Under current rules, the price of unregulated Grade B milk, milk ineligible for fluid use, produced in the Minnesota-Wisconsin region is the basis for the

minimum price for Class III (or IIIa) milk in all federal orders. This price was previously known as the M-W price; however, this price has been slightly reformulated and is now the Basic Formula Price (BFP). The differential between the minimum Class III price and the minimum Class I price is generally higher the further the region is from the Wisconsin.

With different minimum prices in each region, regulations are needed to prevent milk from being transported across regions. Milk transported freely across marketing order borders would undermine the maintenance of separate fluid milk markets in different orders. These regulations ensure that there is generally little economic advantage to arbitrage across prices in different orders.

The FAIR Act left the federal milk marketing orders in place. None of the provisions related to marketing orders required major reforms, but it did set in motion a process that may make some substantial changes without affecting FMMO fundamentals. The FAIR Act required the USDA to consolidate current orders from about 33 when the Act was signed into law, to between 10 and 14. The Act also authorized the USDA to consider multiple basing points and fluid milk utilization rates for setting minimum Class I prices and to consider uniform multiple component pricing in designing a new Basic Formula Price. These changes were to be made under slightly less cumbersome rule making process and are to conclude by the spring of 1999.

After intense regional conflict, the FAIR Act also allowed the Secretary of Agriculture to authorize a "Northeast Dairy Compact" until the federal milk marketing order reform was completed. This provision has led to a spread of regional “compacts” that raise regional milk prices above those provided by marketing orders and limit the movement of milk and some dairy products across regions. Court challenges have not blocked the continued operation of these regional trade restraints within the United States.

California, which accounts for about 15 percent of U.S. milk supply and produces more milk than Canada, has long operated its own marketing order. The basic structure of end-use pricing is similar to the FMMO system, but in California, there are two pool prices that are based on separate weighted averages of the government-set prices for five end-use classes. Further, unlike farmers under federal orders, individual farmers in California receive a weighted average of the two pool prices, with these weights determined by individual ownership of milk quota (Sumner and Wolf, 1996). This quota program has implications for milk output, as well as for the distribution of benefits from the overall program.

Several provisions of the FAIR Act were directed towards milk producers and regulators in California. First, the legislation provides that if California producers petition and receive approval, a federal order for California may become one of the 10-14 federal orders. The Act also repeals the section of the 1990 Act mandating that no state could use manufactured product "make allowances" that were higher than used under the federal dairy program. But, this section was never implemented, and its repeal was primarily symbolic. Finally, the FAIR Act included an explicit allowance for California to require higher solid content standards for fluid milk than are used in federal regulation. These so-called “California standards” are considered by some to be an interstate trade barrier. The international trade implications of the California milk marketing order system will be analyzed further below.

As noted, the USDA is in the process of a major process under which the FMMO system is being examined and modified. As noted above, in federal milk marketing orders there are three or four classes presently. Most of the major proposals for revision would make four end-uses the standard (fluid, soft or frozen products, cheese, and butter/non-fat dry milk). One of the revision proposals would cut the number of end use classes to two (fluid or manufactured

products). None of the current or proposed classes specify the destination for the product created by the milk (See Table 5).

3. Trade implications of marketing orders

The U.S. federal milk marketing order system has a variety of potential effects on international trade in dairy products. First, by raising the marginal price facing producers, pool pricing raises output relative to no pooling. Second, price discrimination shift milk into the manufactured product classes which lowers the U.S. price of these potentially tradable goods and raises the quantity.

A common diagram is often used to illustrate dairy price policy. That diagram shows how class prices and the (weighted average) pool price relate to grower production incentives and buyer demands. Three such figures developed for some specific policy alternatives are presented in this section.

3.1 Key ideas illustrated

Figure 1 illustrates in a concrete, yet simple and stylized way, the price, revenue and export market consequences of adjusting price supports and related policies in order to expand exports at the expense of domestic buyers. The figure includes a representation of classified pricing, a pool (weighted average) price of milk faced by milk suppliers, and a price support program. For simplicity, the figure shows the situation with only two end-use classes. Class F has minimum price of P_F and the quantity of milk demanded at that price is Q_F. For simplicity of the exposition, I treat P_F as a policy choice variable. Under current and proposed policy, the minimum price differentials between class prices rather than class prices themselves are set by the FMMO system. The California system sets class prices by formulas that tend to cause class

prices to move together and maintain a positive differential, but the relationship among class prices is rather loose in the short term.

Under the initial policy, the price support for milk in Class M is shown as P_S and, in this simple model, that price is the effective price in the market for Class M milk. With classified pricing, the total demand for milk by domestic buyers is QD= (QF+ Q_M), where Q_M is the use of milk for manufactured products. For the case shown in figure 1, total purchase of milk by domestic buyers is shown where the demand curve D_D equals P_S, which is at quantity Q_{DS}. This quantity is made up of Class F use of Q_F and Class M use of $Q_M = (Q_{DS} - Q_F)$.

Under FMMO pooling, milk production is not based directly on these classified prices, but instead on the weighted average, or pool, price. For the policy being discussed, the pool price facing farmers is the weighted average of the Class F price, P_F, and the support price, P_S, where the weights are given by share of each milk in total output. In figure 1, this pool price (sometimes called the blend price) is represented by the curved line, B_S,. As Q increases, the pool price gradually declines from P_F towards (but does not reach) P_S. Figure 1 includes the upward sloping line, C', which represents the marginal cost of milk production as milk output expands as well as the supply curve in the illustration. For the policy comprised of a price support, classified pricing and a pool price, the quantity of milk production is shown at Q_{SS}. This is the quantity at which the marginal cost incurred by producers equals the price they face. Figure 1 shows that for quantity Q_{SS}, the average price producers receive is P_{AS}.

Under the price support policy, the quantity of milk produced exceeds that taken by demanders at the price floor P_S. That means the government is left to acquire and dispose of surplus quantity ($Q_{SS} - Q_{DS}$).

Now, consider eliminating the price support. Elimination of the price support is scheduled to occur in the United States at the end of 1999. To fix ideas let us examine the simplest possible case under which the price at which exports occur is fixed at P_W. This would be approximately true if the increase in U.S. exports are a small share of the overall export market for milk products. In this new policy a new blend price curve now applies. The new curve labeled B_W also starts at P_F (for $Q = Q_F$), but gradually falls towards P_W rather than towards P_S. Production now occurs at quantity Q_{SW}, where the supply curve C' crosses the new pool price curve B_W. The quantity purchased in the domestic market is now Q_{DW}, where D_D crosses P_W. Without a price support in place the government acquires no commodity, instead exports occur in the amount (Q_{SW} - Q_{DW}).

Without pool pricing the quantity produced would be Q_{S*} and exports, while still positive, would be quite small. If, in addition, classified pricing was removed, D_D would shift right to reflect the additional quantity demanded for Class F products along D_F, and exports would likely be zero. Of course these statements are for the figure as drawn, which while reflecting the broad proportions in the industry, is not a substitute for quantitiative simulations.

Next, consider the consequences of eliminating the price support for the prices paid by milk handlers and received by producers. Under pool pricing, milk suppliers receive weighted average price P_{AW} for all the milk they produce. Domestic buyers purchase quantity Q_{DW}. The price they pay for milk is given by P_{ADW}, which is the average of the high Class F price and the price P_W. Export buyers pay only the low price P_W. By this particular configuration of policies the price paid by export buyers is far less than the price paid by domestic buyers, which is itself far above the price received by domestic producers. The policy has achieved a transfer of

revenue from domestic buyers to export buyers in order to facilitate export sales at a price far below either domestic price.

3.2 Additional exports stimulated by an increase in the Class F price when the support price is eliminated

Figure 2 examines an elaboration of the policy illustrated in figure 1. It considers a case in which, along with the elimination of the price support, domestic price regulations are adjusted. The government policy has two instruments that may be adjusted to raise the average price paid by domestic buyers while allowing exports at the low export price P_W. Figure 2 illustrates the use of one of these instruments.

In figure 2, the original demand, supply and two pool-price curves are reproduced. In addition, when the price support is eliminated, the minimum price of milk in Class F use is raised to from P_F to P_{FV}. Under this policy a new pool price curve, B_{WV}, replaces the curve B_W and declines gradually from P_{FV} to P_W. Notice that this new classified pricing policy has compensated domestic producers for exposure to the export market by raising additional revenue from domestic buyers. When combined with the other two policies, the removal of price supports alone creates an export subsidy. But when the domestic prices are adjusted as well, this creates even more subsidization. Compared to removal of the price support alone now the price paid by domestic buyers has risen to P_{ADWV}. The price received by milk producers has risen to P_{AWV}. Further, of course, the price paid by export buyer remains at the low price, P_W.

3.3 Additional exports stimulated by an increase in the quantity in Class F (or other reclassification) as the support price is eliminated

Figure 3 illustrates an alternative way to use manipulation of classified pricing and the pool price policy to cause domestic buyers to provide additional subsidy to export buyers. In this

case, rather than raise the price allowed for the milk used for Class F products, the policy is illustrated by an expansion of the milk products placed in the high priced class. This policy shifts some domestic uses of milk from the low price category to the high price category. In the figure 3, P_F is maintained at the price used in figure 1, but there is a horizontal shift in the quantity sold at that price. There is an accompanying shift back in the quantity of Class M milk sold to domestic buyers (not shown). The result of this policy adjustment is a higher price to domestic buyers, a higher price to milk suppliers and a low price to facilitate exports. Notice that under this "reclassification" process, a transfer of income from domestic buyers to export buyers could be accomplished so as to allow average revenue of producers to remain unaffected.

In figure 3, the new higher-class quantity is Q_{FH}. This creates a new pool price curve B_{WH}. With this new pool price curve, the quantity produced is Q_{SWH}, which is well above the quantity before reclassification and only slightly below the original quantity Q_{SS}. That means the price received by producers, P_{AWH}, is also well above the price they would have received without reclassification. In figure 3 the price paid by domestic buyers, P_{ADWH}, is also well above the price paid without reclassification and is approximately equal to the price paid before the policy shift.

The schemes illustrated in figures 2 and 3 show how adjustments in the classified pricing regulations under marketing orders can be used to compensate producers for any losses that might occur from exposure to the commercial export market. These schemes use government milk pricing rules to extract additional revenue from domestic buyers so those export buyers may continue to receive low prices. These schemes reinforce the export subsidy nature of the basic marketing order policy. These policy adjustments allow such a the marketing order policy tp be

used to affect trade at the expense from domestic buyers with no loss to domestic producers and no government outlays.

3.4 A quantitative illustration

Table 6 provides illustrative simulated data that are consistent with figures 1, 2 and 3. These figures are obviously not a full representation of U.S. dairy policy or of any proposed policy. We maintain, for this example, the case of only two end use classes, a single pool price, a single export market, no seasonality and other simplifications. In particular, the simulations abstract from the regional nature of federal milk marketing orders, which are discussed informally below. Despite its simplification I argue that the most import and trade implications of the FMMO system are illustrated by the figures presented above and the simulations reported in table 6.

Table 6 reports prices and quantities for four policy scenarios. The base case reported in the first column concerns the original policy which includes a Class F price, P_F = \$13/cwt, a support price, P_S = \$10/cwt. The resulting average price faced by producers is \$11.20/cwt and the price paid by commercial buyers is \$11.60/cwt. The lower rows indicate the quantities supplied and purchased at these prices. Total milk output is 160 billion pounds and the government is responsible for finding a market for 40 billion pounds.

The second column illustrates the implications of eliminating the price support while maintaining the end use class prices and pool pricing. Now the price support is not relevant and the relevant lower price is P_W = \$9/cwt. Notice that under this policy the domestic producers receive \$10.70/cwt, domestic buyers pay \$11.20/cwt, but export buyers pay only the \$9/cwt that is the export price. Under this case exports are 24.5 billion pounds.

The third column of Table 1 reports on the situation illustrated in figure 2. In this case the Class I price is raised to $14/cwt at the same time the price support is eliminated. Now the price received by suppliers is $11/cwt and the price paid by domestic buyers is $11.40/cwt. Both of these prices are much closer to the original prices paid and received in the first column, even though the price paid by export buyers remains at $9/cwt. In this case, the quantity of exports expands relative to the second column as production increases and domestic use only fall marginally.

The fourth column of Table 1 illustrates the figure 3 case under which some milk products are reclassified and therefore buyers with those end uses are required to pay the Class F price of $13/cwt. In this case, the price received by producers rises back to the $11.10/cwt, nearly as high as the price received in the base case reported in the first column. The price paid by domestic users is also above the price paid when no adjustments of prices or classes were made. Total domestic use is likely to be down slightly, but exports are up, because producers responded to a higher pool price with more output. Finally, note in this case the price paid by export buyers is more than 20 percent below the prices in the domestic market.

3.5 Additional Trade Implications of U.S. Federal Milk Marketing Orders

The U.S. federal milk marketing order system may also have a number of more subtle impacts associated with the disincentives for the movement of fluid milk across regions. The question is whether the regional nature of the FMMO system may cause less milk to be produced in the United States and produced at high cost in places that have little comparative advantage in milk production.

The restrictions that limit the shipments of milk regionally and set high Class F prices in some regions cause lower farm prices and less production in relatively low marginal cost regions

(Upper Midwest). They also cause higher farm prices and more production in relatively high marginal cost regions (Southeast) than would otherwise be the case (Cox and Sumner, and Cox et al). The U.S. market for manufactured dairy products is national and the low-production-cost regions produce the bulk of these products. The markets for fluid milk are regional by regulation (and to some extent due to transport cost).

There are two reasons the farm price is lower in the regions with low marginal cost of production. First, a higher share of the milk produced in these regions is used for manufactured products and the price paid into the pool by processors is lower for milk purchased for these uses. This means the pool-price received by farmers in the low-cost regions is more heavily weighted towards the low-priced milk uses. Second, the price differential paid for milk going into fluid uses is smaller in these regions, so for this reason as well; the pool price is lower. Milk production is encouraged in high cost regions by keeping other milk out, so the fluid use share is high and the fluid differential is also high in the high-cost regions. In absence of regulation the low-cost regions would tend to ship milk out of the area in fluid (or semi-fluid) form. Thus, they would tend to have somewhat lower prices than milk importing regions by the transport cost between relevant markets.

If the regional restrictions were reduced in the FMMO system, which is the direction of the proposed reforms favored by the USDA (USDA/AMS, web site; and Stillman, 1998), then the average price would rise and more milk would be produced in the low-cost regions. More of that milk would be transported in fluid or semi-fluid form and used for fluid consumption and less milk would be produced in the high-cost regions. The overall effect of reduced regional barriers on national milk production, on national fluid milk consumption, and on milk available for tradable and import-competing manufactured products depends on regional supply and

demand elasticities, about which we have no good information. Overall, unless regional differences are large with respect to the demand elasticities for Class I products or the relevant output supply elasticities, then the output effects of regional barriers would seem to be small. (Note, the relevant elasticities are for price movements in opposite directions in the two regions. For the low-cost region the farm price and the fluid milk price to consumers will both rise, while the opposite is happening in the high cost regions.) International influences of all this depend mainly on the effect on the residual market for manufactured products. In that context, a full analysis should consider the potential cross elasticities of demand between fluid dairy products and butter, cheese and dry milk powder. These are often considered small, but evidence is weak.

The overall effect of the Federal Milk Marketing Order system on aggregate U.S. milk production depends on the offsetting impacts of regional biases and product price discrimination. Elimination of the Federal Milk Marketing Order restrictions and disincentives on inter-region movement of milk for fluid use and the elimination of high fluid-use price differentials would cause substantially less milk to be produced in the Southeast. Without the Federal Milk Marketing Order system, more milk from the upper Midwest and other low-cost regions would move to supply the fluid-use demands in the Southeast.

Given the high fluid-use differential in the Southeast, the blend price is high enough to entice milk production that enters manufactured products during some periods. In order to understand the impact of the FMMO system, it seems to be important to know the overall production impact of lower prices in the Southeast coupled with higher prices in the upper Midwest. The relative supply elasticity's in the two regions seems to be crucial information.

Cox and co-authors has analyzed these questions with a detailed simulation model that is based on econometric parameter estimates of key regional supply and demand estimates. The sensitivity of his results to these regional elasticities needs to be explored further.

Classified pricing, price pooling, and adjustments to support prices allow export subsidization to be achieved without recourse to government outlays. Potential exports from the United States are a small share of total dairy production, therefore the benefits to exporters can be provided with relatively small per unit increases in revenue collected from the domestic market. Further, only a select list of products are likely to be available to export markets. This fact means that the milk eligible for subsidization can be designated by specifying by end use with the effect that exports actually receive the subsidy. The complexity of U.S. dairy policy provides an ideal setting for indirect yet effective export subsidy by adjusting price regulations.

4. Trade implications of the California milk marketing order

4.1 The California Order in a National System

As with the federal system, the California system includes classified pricing such that buyers pay into the state-operated revenue pool according to the end-use of the milk. In California, there are five basic classes, each based on the end product created . The class structure in California is similar to that used in the federal system. Milk used for fluid products is in the high-price class, soft and frozen products are next, and cheese, and butter and nonfat dry milk are normally the lowest price classes. The details about which classes are associated with which products have changes slightly from time to time as have the formulas for calculating minimum class prices.

To consider the implications of the California marketing order for trade we must consider the pool quota system and classified pricing. Minimum prices for Class 4a and 4b milk are

determined by CDFA using public hearings and formulae based on national markets for each manufactured milk product (butter, powder or cheese). These prices are influenced by federal price supports and FMMO policy. As noted above these policies are changing. Prices of Class 2 and 3 milk are determined by fixed differentials from the Class 4a and 4b milk. Finally, Class 1 milk prices are determined by a formula based on cheese and butter prices in national markets (CDFA, 1994 and 1998). Total milk revenue is determined by multiplying the class usage in the pool by its appropriate class price. This results in the pool-wide usage for each class and its related value.

Each producer in the pool is paid according to the volume of sales and quota owned. Until 1993, quota milk was assigned to the highest-priced classes until aggregate quota milk was fully allocated (i.e., quota milk was first assigned to Class 1, then to Class 2, etc.). The price of quota milk was set as the weighted average of class prices for milk associated with quota. Non-quota milk received a weighted average of the class prices for the residual after all quota milk had been allocated first. The milk price differential that determines returns to quota ownership was the difference between quota and non-quota milk (Sumner and Wolf, 1996).

The difference between quota and non-quota milk prices was fixed at $1.70 per hundredweight of milk for 1994 and then extended without a deadline. As noted, until 1994, the milk price differential was determined by a mixture of state and federal regulation and market forces. Currently, the differential is set explicitly by California State regulation. However, federal dairy policies are changing and placing pressure on California policy. The recent Federal Agricultural Improvement and Reform Act specifically invited California to join the federal milk marketing order system if producers vote to do so. Further, the California quota system is explicitly protected in the legislation.

The return to owning California milk quota is tied ultimately to the price differential between milk under quota and non-quota milk. The value of quota also depends on allocations of new quota. Since quota revenues are determined by the California Pooling Plan, quota prices are very sensitive to changes in those regulations (Sumner and Wilson, 1998).

Milk quota in California is a tradable asset. Quota may not be rented and is traded in a market limited to the roughly 2,000 eligible dairy producers. There have usually been between one hundred and two hundred sales each year, with sales occurring almost every month. Certain special features of the asset and the market are important for our analysis. Liquidity in the quota market is limited in that only active dairy producers may participate. Even among eligible owners, liquidity is limited: a) in general, quota cannot be sold for two years after purchase, b) producers cannot buy back quota if they sold any in the previous two years, c) new quota allocated by the state cannot be sold for five years, and d) producers cannot qualify as new entrants if they bought or sold quota during the preceding ten-year period. Quota owners receive the milk price differential only for milk sales equal or larger than the quota owned; if milk sales are smaller than the quota owned, no added milk revenue is earned by the excess quota. Finally, the state has regularly created new quota based on formulae that have changed only occasionally.

The value of pre-existing quota is affected by new quota in two ways. First, adding new quota to the total dilutes the value of pre-existing quota and, second, the free distribution of new quota is an additional value of quota ownership for the individual producer. Until 1985, total quota was increased whenever Class 1 milk usage on a solid-not-fat (snf) basis in a 12-month period exceeded the previous year Class 1 usage of snf. Additional quota was issued for a volume equal to the observed difference. From 1985 until 1993, the comparison was made

between the current Class 1 usage and the previous highest usage. Currently the comparison is made for Class 1 and Class 2 milk.

The quota program is a redistribution of milk sales revenues from non-quota holders to quota owners. Quota has increased faster than Class 1 usage; from 1969 until 1994 the quota pool increased 46.6% (from 550 million pounds of snf/day to 790 million pounds of snf/day) while Class 1 usage increased by 26.2%. Milk production in California grew faster than quota; as a consequence, the share of milk revenues transferred annually from non-quota owners to quota owners fell from 14.46% in 1971 to 3.59% in 1993. The total value of quota in 1998 was about $700 million dollars.

As shown in Sumner and Wolf the quota system lowers the effective marginal price facing producers and reduces output relative to the FMMO system without the pool quota provisions. With less milk production, California produces small quantities of tradable manufactured milk products than it would under the FMMO system. This reduces the export impact and import substitution effects of the price discrimination and pool pricing.

In the FAIR Act, California was invited to join the federal system with the assurance that it could maintain state borders as the federal order region and that it could maintain its market-share quota program. The incentive for California to join the federal system related mainly to limits on state rules to block interstate commerce and is instructive in the context of a single North American market for raw milk.

Under federal law and regulation, the system is of regional price differentials is maintained and arbitrage is successfully restricted, though not without considerable regional strife within the industry (Cox and Sumner). The restrictions on arbitrage under the federal milk marketing orders has been protected under U.S. law even though restriction of trade among states

is generally prohibited by the Interstate Commerce Clause of the U.S. Constitution. Therefore, whereas arbitrage between the Upper Midwest market (Wisconsin) and the Southeast market (Florida) is restricted by law, California is not allowed to restrict directly the arbitrage associated with its price policy.

In the past, two factors reduced the pressure on California's milk marketing order. First, being geographically isolated from other major milk producing regions has meant transport cost were relatively high. Second, California has maintained lower milk prices than neighbor states. In general, each class price and the blend price in California has been below that available in other markets. However, in recent years this has no longer been enough to remove the incentive for arbitrage. Under the FMMO, a producer in, say Arizona, would receive the blend price in the local federal order. That blend price is usually above the relevant blend price paid by plants in southern California, but it may be well below the California class 1 price paid into the California pool by bottlers of fresh milk. If the difference between the California class 1 price and the Arizona blend price were higher than the transport cost, there would be an incentive for arbitrage. Notice that this is a purely policy created arbitrage. Cost of production may be lower in California and average and marginal producer price is also lower, yet as long as the class 1 price in California is above the average price in Arizona milk may flow.

The result of this arbitrage in California would be a decline in producer revenue. The milk from out of state flows only into the high price uses so the "imported" milk reduces the share of fresh uses in the weighted average price received by California producers. In 1997 the California instituted policy modification that restricted California based processors from paying any more than the highest price received by a California producer for the same milk—the non-

quota blend price plus the $1.70 pre hundredweight quota premium. This modification has been tested in the State courts and is currently under review in federal courts.

Consider the effect of creating a California federal milk marketing order and thus limiting interstate arbitrage based on policy differences. First, milk from Arizona (or Nevada) that was shipped to California would now be priced under the California order. These producers, who as yet have no California pool quota, would receive the lowest of the California blend prices, which is below the blend price they would receive in Arizona. So the result would be that, with policy harmonization, no trade would flow. This case shows how policy harmonization, or at least having a common jurisdiction, can reduce trade.

4.2 Explicit export provisions of the California order

Whereas the U.S. marketing order policy does not include any explicit export provisions, this is not the case for the State of California milk marketing order system. California regulations provide for re-classification of certain products depending on the final destination market for the product. Table 7 shows the reclassification that applied in 1998. Some products are reclassified to lower minimum-price classes if they are sold outside of California, some are reclassified if the are sold outside the 48 contiguous States, and some requires sales outside of the United States boundaries before reclassification occurs. However, as defined in the application of the reclassification system, shipments to U.S. territories such as Guam qualify for reclassification.

The reclassification provision in the California marketing order system seems clearly designed to stimulate sales of some products outside of California and, in particular, to facilitate profitable sales that would not be made if the reclassification were not allowed. Under classified pricing, products expected to have higher demand elasticities are placed in lower-priced classes.

Export reclassification acknowledges that, with effective import barriers (for example, due to sanitary rules, transport costs or tariffs), the demand elasticity in the export market may be higher than in the protected domestic market. Thus, a price discrimination scheme would naturally charge lower prices for exported goods. The products available for reclassification include UHT processed fluid products that are designed for shipment over long distances and have longer shelf life. Sour cream, yogurt and cottage cheese, other products eligible for reclassification, also have potential out-of-state markets.

Until recently there was no data collected on the shipments of dairy products under the various reclassification rules. According to California Department of Food and Agriculture personnel, processors would determine milk eligible for the reclassification and report that use in the lower class. Data on the total amount of milk reclassified into class 4a has been provided for the period 1995 through 1997 in Table 8. The remarkable characteristic of these data is how little milk is actually reclassified. Clearly, this program is for a few specialized products and cases. The quantity of milk involved is simply not large enough to have a major effect on milk prices or quantities in California. The California Department of Food and Agriculture began collecting current information on more details of the reclassification quantities in January 1998.

The California dairy reclassification system is at least similar to the sort of producer-financed export subsidy that could be challenged under the Uruguay Round export subsidy provisions. However, it is not clear is how much of the reclassified milk is actually exported. Clearly a small amount of milk enters the program for any destination and informal reports are that only a small share of that milk is actually exported to foreign countries. It is not clear that this system is important enough quantitatively to attack in a trade dispute, or, if attacked, if it is important enough to defend.

Summary and final remarks

Current U.S. dairy policy is relatively transparent in it's major trade effects and has relatively few STE aspects. The export provisions in the federal programs are clear and the explicit price subsidies are under WTO reduction commitments. The promotion, credit and food aid provisions are relatively minor, but these may well come under WTO review after the next set of negotiations. On the import side, the TRQ system is beginning to provide for slightly more access compared to before the URA, but protection remains large and important.

The Federal Milk Marketing Order system has complex effects on trade, but these all seem to be second order. What is clear is that this system depends on limited access of fluid milk. Further, if explicit import barriers were removed, then the supply increase caused by pooling and the lower price for manufactured milk products caused by classified pricing, would themselves reduce imports or encourage exports of manufactured milk products. Under the current explicit trade barriers, these indirect impacts are relatively unimportant. Further, it is not clear that the price discrimination and pooling would survive under an open trade regime.

The California milk marketing order system does less to stimulate output relative to the FMMO system and also does less to drive down the price of butter, milk powder and cheese. It does however contain some explicit export provisions that have a small but clear export subsidy element.

Overall, the major trade story for dairy products in the United States remains the import barriers and export subsidies maintained by many countries around the world. U.S. import barriers is one part of that large web of explicit and implicit barriers and subsidies.

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Table 1. The Evolution of the Support Program for United States Dairy Price

Year	Support Price ($/cwt.)	CCC Net removals (percent of production)[a]
1977	8.13	4.97
1978	9.43	2.22
1979	10.76	1.70
1980	12.36	6.85
1981	13.49	9.71
1982	13.10	10.55
1983	13.10	12.03
1984	12.10	6.35
1985	11.60	9.30
1986	11.60	7.55
1987	11.10	4.77
1988	11.10	6.27
1989	10.60	6.52
1990	10.10	6.07
1991	10.10	7.00
1992	10.10	6.66
1993	10.10	4.45
1994	10.10	3.12
1995	10.10	1.35
1996	10.35	0.06
1997	10.20	0.70
1998	10.05	0.50[b]

a) Production and net removals are on milkfat basis. Skim solid removals have been larger than milkfat removals since 1995. On a total solid basis, percentage net removals were 2.25% in 1995; 0.32% in 1996; 1.72% in 1997; and are projected to be 1.71% in 1998.
b) Projection.

Source: USDA, ERS "Dairy Situation and Outlook," Various Issues and Agricultural Outlook, November 1998, Table 12.

Table 2: U.S. Dairy Import Quotas and Actual Imports

Table 3: Explicit Export Price Subsidies for U.S. Dairy Products

Year/ Commodity	URAA Commitments		DEI P (Fiscal Year)	
1995	(Thousand Tons)	(Million $)	(Thousand Tons)	(Million $)
Butter	43.0	44.8	38.5	21.6
NFDM	108.2	121.1	186.9	97.7
Cheese	3.8	5.3	3.4	4.0
Other	12.5	14.4	19.4	17.0
1996				
Butter	38.6	41.9	0.0	0.0
NFDM	100.2	113.4	42.7	16.8
Cheese	3.7	5.0	2.5	2.1
Other	10.0	11.5	2.6	1.6
1997				
Butter	34.2	39.1	18.0	20.1
NFDM	92.2	105.7	114.0	93.8
Cheese	3.5	4.7	3.7	2.8
Other	7.5	8.6	4.7	5.1
1998				
Butter	29.9	36.2		
NFDM	84.2	97.9		
Cheese	3.4	4.3		
Other	5.0	5.8		

Source: USDA, FAS.

Table 4: GSM Export Credit Programs for Dairy

Fiscal Year	Quantity	Value
	(Thousand Tons)	($ Millions)
1995	2.6	4.9
1996	3.4	7.1
1997	6.8	13.0

Source: USDA, FAS

Table 5: Changes in End-use Prices under Proposed U.S. Marketing Order Reform

Current System	Proposed System
Class I Price = Class III or Basic Formula Price (national price) + Class I differential (order specific)	*Class I price* = higher of Class III price (national price) or Class IV price (national price) + Class I differential (order specific)
Class II price = Basic Formula Price + $0.30/cwt (national)	*Class II price* = Class IV price (national price) + $0.70/cwt (national)
Class III or *Basic Formula* Price (national)	*Class III price* (national)
Minnesota-Wisconsin Grade B price updated by a product price formula	Formula based on butter, cheese, and whey prices
Class III-A (national)	Class IV price (national)
Formula based on nonfat dry milk prices and the butterfat differential	Formula based on butter and nonfat dry milk prices

Source, Richard Stillman, USDA, ERS, 1998.

Table 6: Price policy adjustments create export subsidies: An illustrative simulation

Price & Quantity	Base case	No Price Support	Adjust Class I Price	Adjust Class I quantity
	(1)	(2)	(3)	(4)
($/Hundredweight)				
Class I Price (P_I)	13	13	14	13
Support Price (P_S)	10	--	--	--
Export Price (P_W)	--	9	9	9
Producer Price (P_A)	11.20	10.70	~11.00	~11.10
Consumer Price (P_D)	11.60	11.00	11.40	11.60
(Billion pounds)				
Output Supply (Q)	160	154.5	157.5	159
Class I Demand (Q_I)	64	64	62	84
Total Dom. Demand (Q_D)	120	130	~130	~130
Gov. Quantity (Q_G)	40	--	--	--
Export Quantity (Q_E)	--	24.5	~27.5	~29

Source: Author calculations, based on a two class model, approximate U.S production of 160 billion pounds, Class I use of 64 billion pounds (at P_I of $13/hundredweight) and simple linear supply and demand curves. The Class I demand elasticity at the initial price is approximately 0.4; the Class M demand elasticity at the initial price is 1.8. The supply elasticity at the initial price is approximately 0.8. Government quantity reflects all demand associated with any government role, but is nonetheless high relative to current quantities in order to make the figures more readable. None of the key ideas depend on the specific numbers in the Table.

Table 7: California Milk Products Subject to Reclassification Based on Destination

Product	Classification if sold in California	Classification if sold outside U.S. boundaries[b]
Cottage Cheese (all types)	2	4a
Sour Cream (all types)	2	4a
Yogurt (all types)	2	4a
		Classification if sold outside the 48 contiguous states
UHT Fluid Milks (whole, lowfat, nonfat, flavored)	1[a]	4a
UHT half & half	1[a]	4a
Other UHT products	2	4a

a) These products are Class 2 if sold outside California, but within the 48 contiguous states.
b) "Outside U.S. boundaries" includes shipments to U.S. territories such as Guam. Data is not readily available to indicate how much of this product is actually shipped to other nations.

Table 8: Percentage of California Milk Reclassified to Class 4a Based on Destination,

Period	Average Percent of Milk Reclassified
July – December, 1995	0.12%
January – June, 1996	0.15%
July – December, 1996	0.17%
January – June, 1997	0.10%
July – December, 1997	0.06%
July 1995 – December 1997	0.12%

Note: As noted in the text and in Table 7, reclassification does not imply export.

Source: California Department of Food and Agriculture, Milk Pooling Branch

Figure 1: Classified pricing and pool prices with a support price or an export price

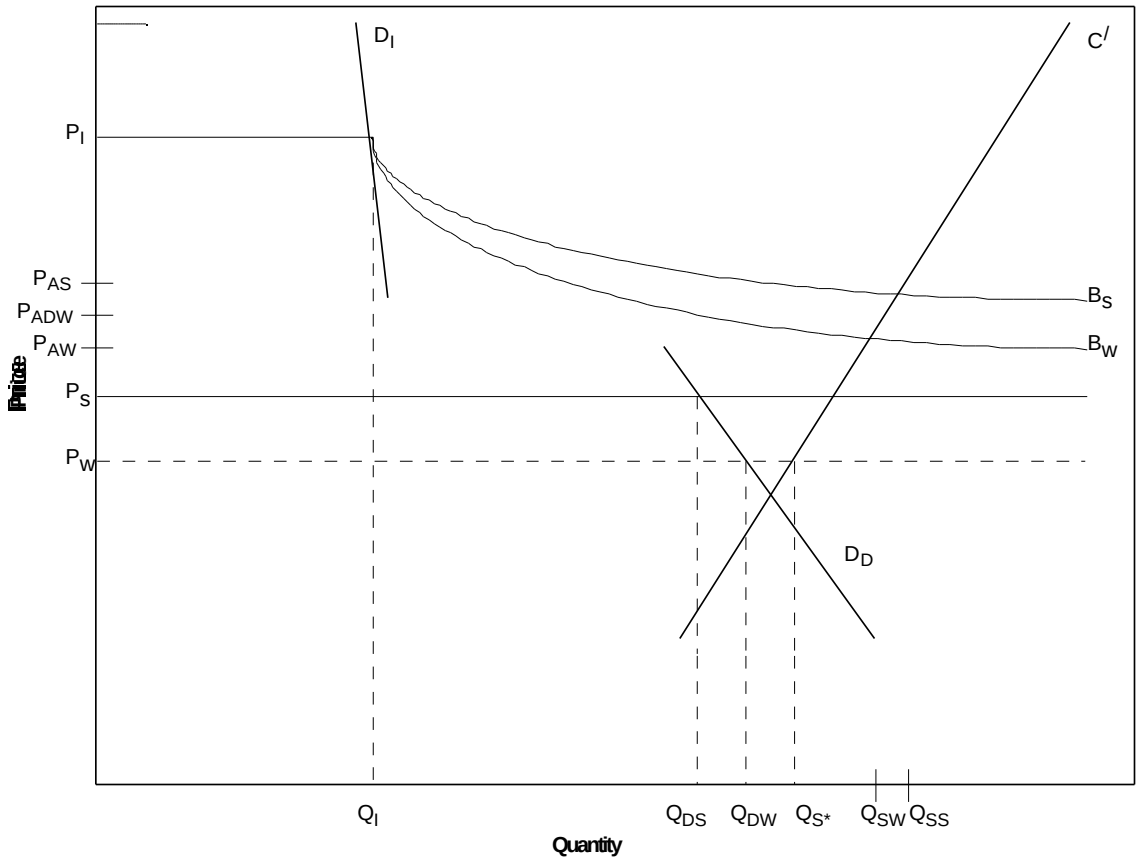

Figure 2: Export subsidy by removing price support – increasing class prices

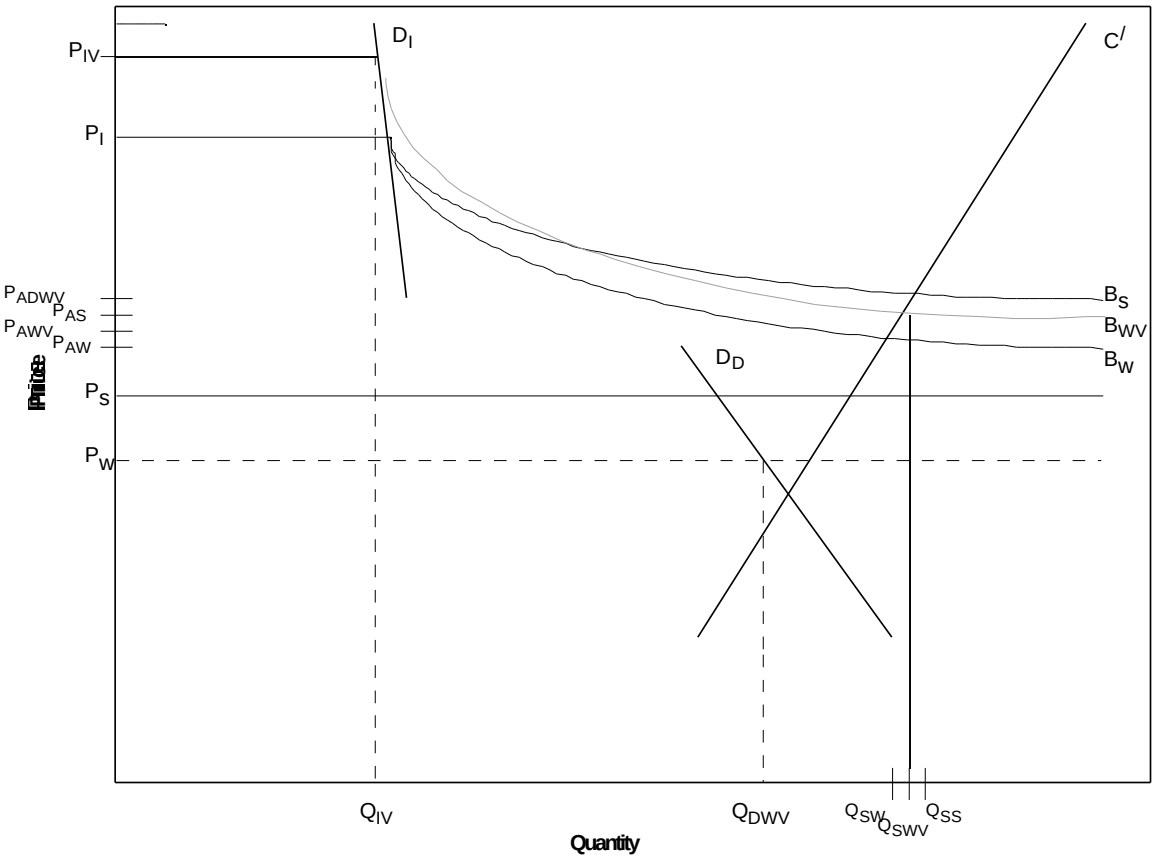

Figure 3: Export subsidy by removing price support – adjusting milk classification