Supply Management for the U.S. Dairy Industry? Opportunities and Challenges

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The U.S. dairy industry is considering a proposal to support federal legislation to implement supply management in the form of production quotas with "market-access fees" charged to those who exceed their production quota. We describe the proposed program, examine its potential to address low and unstable producer prices, and identify some key limitations and likely unintended consequences of the program.

The U.S. dairy industry has been buffeted by severe price fluctuations in recent years and, most recently, by extremely low prices that have caused milk producers across the country to exit the industry. Some in the industry are now looking to supply-management tools to help stabilize producer prices and insure profitable production. Supporters of supply management have coalesced behind a plan to establish production quotas for each producer, based upon historical production, and assess penalties in the form of "market access fees" (MAF) to producers who expand production beyond their eligible base.

Supply management (SM) has a potential to address the problem of low prices, but successful implementation of such a program faces many challenges. The most significant is the impact of such a program on dairy exports from the United States and dairy imports into the country. We also foresee various practical difficulties associated with controlling domestic supplies that will impede the effectiveness of a program. We elaborate on these points in the remainder of this article.

The Proposed Supply-Management Program

Our evaluation is based upon the plan proposed by the Holstein Association. A summary is available at its Web site: http://holsteinusa.com/pdf/DSPS/DSPS_plan_v14_072209.pdf. In brief, the proposal would be enacted by federal legislation, with administration by the U.S. Department of Agriculture (USDA). The plan would assign a base to each producer equal to her milk sales in a preceding 12-month period. Bases are transferable with sale of a dairy, but otherwise are not transferable. An appointed board would advise the Secretary of Agriculture as to milk production required on a quarterly basis "to fulfill the market needs" and allow "for a producer raw milk price that is positive over operating costs." Producers who expanded production in a quarter beyond their allotment would be charged a MAF on their *total* milk marketing for a 12-month period. The volume of sales during this period of paying the MAF would then become the new historical base moving forward. New dairy producers would pay the MAF on their entire production for the first 12 months to establish a base moving forward.

Production levels would be monitored and reported to the USDA by milk processors, who would deduct the MAF from the milk checks of producers who exceeded their base, upon notification by the USDA. Money collected from the program would be redistributed back to producers who maintained their production within their base allotment.

The Economics of Supply Management in the Dairy Industry

Both demand and supply at the farm level for raw milk are price inelastic in the short run. A reasonable estimate for the price elasticity of demand is in the range of –0.5 to –0.6. This means that the market price changes substantially in response to small, unanticipated shifts in demand or supply. Supply shocks to the domestic market have been due to a rapid run-up in feed costs, and diversion of some U.S. production into the export market based upon conditions in the global market. More recently, negative demand shocks have resulted from the worldwide economic downturn. As the United States becomes more integrated into a world dairy market, the U.S. industry is exposed to a broader set of shocks.

Individual decisions made by a large group of competitive producers inevitably causes production to be expanded in excess of the amount that would maximize industry profits. The "overproduction problem" is especially severe for industries, such as the dairy industry, which face an inelastic demand, and thus the nominal potential for a successful SM program is greatest in such industries. However, the historical track record of success for supply management is not good. Most successes have been international cartels for nonrenewable resources or industrial cartels (usually illegal) involving relatively few players.

To be successful, a SM program must satisfy four criteria:

- An agreement must be reached
- Because there are always incentives to cheat on a successful agreement, cheating must be detectable
- Cheating, once detected, must be punished
- Outside entry must be deterred.

Reaching an agreement. Voluntary SM programs are vulnerable to "free riding" because outsiders do not bear any of

Table 1. U.S. Milk Imports and Exports (billions of pounds)		
	2007	2008
Milk production	184.5	188.8
Fat basis imports	4.6	3.9
Skim-solids basis imports	4.4	3.8
Fat basis exports	5.7	8.8
Skim-solids basis exports	24.5	26.6

Source: USDA World Supply and Demand Estimates, May 12, 2009

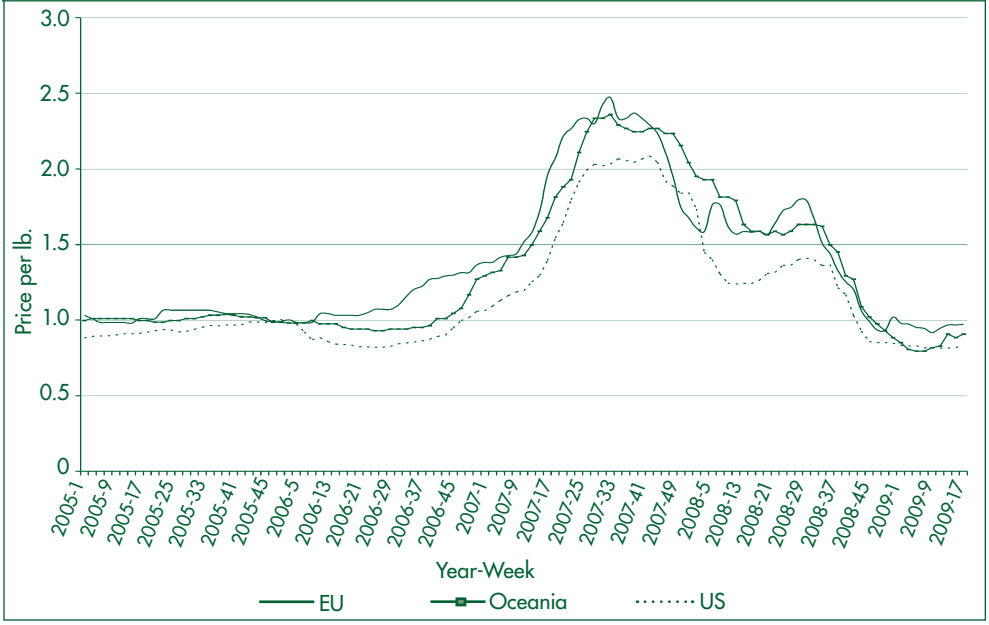
the costs of the plan, in terms of providing financial support or restricting their production, but do capture the benefits in terms of higher prices caused by reduced supplies. The proposed MAF program addresses this problem for domestic producers by making participation mandatory through federal legislation. However, it is likely that in the legislative process various types of producers (e.g., organic) would seek and obtain exemption from the program, thereby creating a class of free riders.

Detecting cheating. Incentives to cheat exist for any successful SM program because such programs raise market price above producers' marginal cost of production, meaning any individual has incentive to expand production beyond his allocation. Such cheating can lead quickly to the demise of the program.

The MAF program's requirement that individual production levels be reported to the USDA by processors is a good way to control cheating. There, of course, is no guarantee that such reporting will be done faithfully, but insertion into the legislation of stringent penalties for untruthful reporting would act as a strong deterrent. However, cheating could occur before milk ever reaches the processors. One way to circumvent the reporting requirement would be to transship milk from a producer who is above quota to a producer who is below quota. Black markets could also emerge, with producers selling milk outside of normal marketing channels.

Punishment of cheating. Any legislation authorizing the MAF program should have stringent provisions in place to punish dairies or processors who cheat on the mandatory reporting requirements. However, it is very difficult to write legislation that anticipates all of the ways a SM program can be circumvented, and it may be difficult to successfully prosecute suspected cheating. Cheating will occur if businesses perceive a positive risk-reward tradeoff.

Figure 1: Price per Pound of Nonfat Dry Milk



Prevention of outside entry. Entry probably constitutes the single greatest challenge for SM programs generally, and in our view it is the most significant challenge facing SM in the U.S. dairy industry. Entry into the U.S. market for dairy products may come either from new domestic producers or from imports. The MAF program proposes to handle domestic entry by charging the MAF to new entrants on their entire sales for their first year of milk production. This regulation would represent a significant barrier to new domestic entry and a rather unprecedented attempt by an industry to tax entrants and redistribute those tax revenues among industry incumbents.

Given the barriers in place in the proposed program to handle domestic entry, we look next at the potential of increased imports and reduced exports in response to the program. Imports are not covered under the proposed program, nor, due to WTO considerations, is it likely that additional controls on imports could be enacted.

Impacts of Supply Management on Imports and Exports

If a SM program succeeds in increasing the U.S. price above the world price for various dairy products, it is certain that world trade flows will be directed towards the United States to the extent possible and U.S. exports would be curtailed. Reduced exports mean that more of the domestic production must be sold at home.

Imports of dairy products into the United States are regulated by a tariff rate quota (TRQ) system whereby some imports are allowed subject to what is usually a nominal tariff, and then imports beyond the quota level are subject to a higher tariff. There is presently no mechanism to sustain U.S. exports if U.S. prices became noncompetitive. Export subsidies could possibly play such a role, but they would have to be sufficient in magnitude to make up for

the decrease in the world price relative to the domestic price. The USDA presently operates a small Dairy Export Incentive Program designed to counteract subsidized exports from other countries. The scale of this program is severely limited by U.S. commitments under the World Trade Organization.

Table 1 reports total production, imports, and exports of milk for the United States, for 2007 and 2008, on both a fats basis and skim-solids basis. On a fats basis, imports constituted on average 2.1% of the total U.S. supply. Imports on a skim-solids basis were 2.0%. Export has only recently become a rather important outlet for U.S. dairy products. For the same two-year period, U.S. commercial exports were 3.6% on a fat basis and 12.7% on a skim-solids basis.

Despite substantial regulation of the dairy industry by individual countries, the relevant geographic market for various key dairy products is worldwide, meaning that prices for the same product move in relative lockstep regardless of the origin of the production. Figure 1 illustrates this point for prices for nonfat dry milk for the United States, European Union, and Oceania (Australia and New Zealand), from 2005 to the present.

Thus, a U.S. SM program that caused U.S. prices to deviate from those in the rest of the world would certainly trigger responses from traders in dairy products to exploit such a price differential. The impact of such international arbitrage would be to reduce or eliminate differences in price between the United States and the rest of the world. The most obvious form of arbitrage is for importers to sell more dairy products into the United States and for less domestic production to be exported. Existing quotas on dairy imports are not binding for most products and most importers, meaning that imports could be expanded from their current volumes at the lower tariff levels. Table 2 includes volume of imports into the United States for 2006–2008, and the level of the TRQ for key importing countries for butter, dried skim milk, dry whole milk, and dry buttermilk/whey. The values highlighted in bold face are (the relatively few) instances when the TRQ was binding. Moreover, the dual facts that (a) dairy products can be manufactured and shipped in various forms, and (b) the TRQ structure varies widely by country and product, give arbitrageurs considerable incentive and opportunity to find creative ways to bring more dairy products into the United States in response to higher U.S. prices, despite the barriers created by the TRQ.

Indeed, imports of dairy products into the United States are highly variable over time and responsive to changing market conditions, illustrating that they can be ratcheted up or down as conditions in the U.S. market

Table 2. Tariff Rate Quota (TRQ) by Country and Commodity

Butter

Country	TRQ (KG)	2006 Imports	2007 Imports	2008 Imports
New Zealand	150,593	150,510	121,541	48,845
EU-25	96,161	95,391	87,728	81,492
Other countries	73,935	72,777	63,209	20,179
Any country	6,656,311	6,594,418	6,137,907	4,842,353

Dried Skim Milk

Country	TRQ (KG)	2006 Imports	2007 Imports	2008 Imports
Australia	600,076	3,120	0	544
Canada	219,565	0	0	0
Any country	4,441,359	410,450	316,470	30,250

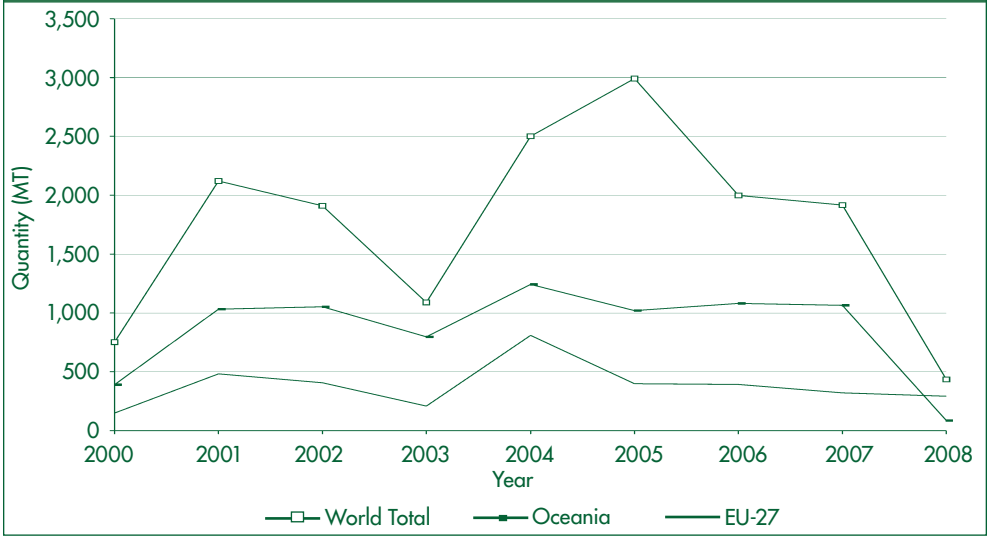
Dried Whole Milk

Country	TRQ (KG)	2006 Imports	2007 Imports	2008 Imports
New Zealand	3,175	**3,175**	**3,175**	425
Any country	3,318,125	3,309,965	1,935,907	421,904

Dried Buttermilk/Whey

Country	TRQ (KG)	2006 Imports	2007 Imports	2008 Imports
Canada	161,161	0	0	0
New Zealand	63,820	0	0	0

Figure 2. U.S. Butter Imports



change. This point is illustrated in Figure 2 which plots total imports to the United States and imports from key regions from 2000 through 2008 for butter. Butter imports fluctuated by over 600% during this period.

U.S. exports of dairy products are also highly variable and responsive to market conditions. For example, exports of milk powder were in the range of 100,000 MT in 2005 and 2008, but only about 60,000 MT in 2006 and 2007. The United States is a "small country" exporter of dairy products, in the sense that its exports constitute a small share of the traded volume and, accordingly, its volume of exports has little or no impact on prices in the world market. This means that the United States can expect to sell little or nothing abroad if its prices are above world levels. Thus, most or all domestic production under a SM program that raised U.S. prices relative to the world would have to be sold in the domestic market, increasing the domestic supply and reducing domestic prices. The arguments that more stable U.S. prices might make U.S. marketers more desirable trading partners on the world market, or that the United States will be able to market "value added" products despite higher prices, are unpersuasive. For the most part trade is conducted for intermediate products, which are pure commodities where price competition is intense.

Increases in imports and decreases in exports caused by a SM program will reduce the U.S. producer price, based upon the price elasticity of the domestic demand. Since the domestic demand is price inelastic, a given percentage increase in total supply from an increase in imports and/or decrease in exports causes a greater percent decrease in the farm price of milk. A rule of thumb is that each additional percentage point increase in total domestic supply due to higher imports or reduced exports will cause the U.S. producer price to fall by two percentage points. Thus, if the administrators of a SM program were going to attain price objectives, they would have to impose increasingly stringent controls on the portion of the supply they controlled.

Issues, Challenges, and Unintended Consequences

The suggested amount of the MAF is substantial—in the range of $2-3 per hundred weight. Applying the MAF to a producer's entire production creates various perverse incentives. First, it creates

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an incentive for large expansions in herd size. This point is a simple consequence of the average cost per hundredweight of expansion declining in the amount of expansion because the MAF must be paid on the entire production, not just the amount in excess of the base. Thus, a producer would never intentionally exceed his base by only a percentage point or two. Producers contemplating expansion will either not expand at all or expand substantially to spread the fixed cost of paying the MAF on their entire base. Thus, paradoxically, the program could cause *more* supply expansion than would otherwise take place. Second, for a producer who was on the verge of succeeding his base in the final days of a period, a rational response would be to dump milk. Opponents of the program could choose to publicize such incidents, leading to unfavorable publicity, especially for a basic food item such as milk.

The plan also creates incentives for producers to expand production to the maximum amount allowed in every period. This result is a consequence of base being a moving average of *actual* past production, not *allowable* past production. Thus, suppose a 2% expansion in base is permitted during a given year. A producer who does not expand by the allowable 2% forfeits that base. If the SM program succeeds in the short run, then base will have a value and producers will rationally want to maximize the amount they control.

Making the base nontransferable creates inefficient production. Again, assuming the program is successful, base has economic value, and producers are unlikely to sacrifice it. Inefficient operations will stay in business, and efficient operations will be impeded from expanding. Under a scenario where base was transferable, inefficient operations would sell base to efficient operations that sought to expand.

Conclusion

Although a supply-management program in the U.S. dairy industry has the potential to improve farm prices, there are many barriers to successful implementation of a program. For the most part, these barriers have not been considered adequately in the discussions to date regarding the proposed programs. The cumulative impact of the various considerations discussed here is that the supply of milk and dairy products to the U.S. market may be considerably greater than projected, either through increased imports, reduced exports, and/or greater domestic production than the plans envision. Each additional percent of supply will reduce the producer price by about 2%, meaning that either price goals will be unmet, or producer bases will be reduced relative to what is envisioned in order meet price objectives.

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