Executive Summary

The US dairy industry has made remarkable improvements in productivity and policy over the past 30 years. Productivity growth has increased the industry’s global competitiveness and allowed prices to fall in real terms to the benefit of consumers. These gains have allowed a shift from milk policy that was dominated by border protection, production and export subsidies, and government regulations to a much more self-reliant and resilient dairy industry.

The 2014 Farm Bill cleared away several outmoded programs, such as price supports, export subsidies, and payment schemes that had distorted incentives and encumbered the industry for decades. However, it left in place or created new government programs that, while they provide relatively little long-term net benefit to the industry, continue to cost US consumers and taxpayers and cause incentives among farms and processors to produce in response to government program incentives rather than market incentives from consumers.

This report does not consider or evaluate environmental and related policies that affect milk supply and cost. Many environmental regulations—such as those dealing with local air quality, water quality, animal care practices, and greenhouse gas emissions—are probably the government policies that matter most to many dairy farms and milk processors. Some of these state and federal policies raise milk production and processing costs substantially and must be subject to careful analysis to assure that the environmental benefits match the economic costs.

Explicit and identifiable dairy export subsidies have been removed, the impact of import protection has lessened with increased global demand, and the US dairy industry has become a major commercial exporter of dairy products. The US exports much more milk than it imports, and this occurs with relatively little effective protection from foreign competitors. However, US tariff schedules are littered with dozens of high tariffs for specific dairy products, often tied to tariff-rate quotas (combinations of low and high tariffs) that are assigned to specific exporter countries. These hamper trade in those particular products, hurt US consumers, and generally divert effort from competitive markets and, instead, toward gaming the complicated trade policy system. Those tariffs could all be eliminated with little or no negative impact on producers or processors. Then the US dairy industry could focus on what it does well, adapting to competitive markets.

Within the United States, milk pricing and distribution across products is dominated by an 80-year-old array of price regulations of mind-boggling complexity. Federal Milk Marketing Orders (FMMOs) set minimum prices that raise the prices of beverage milk products on a regional basis while raising price variability and increasing price risk for farms and processors.

The high prices of beverage milk have reduced use and stimulated demand for products such as soymilk. These same high prices for beverage milk have driven farm milk toward manufactured products and through a price pooling scheme have created incentives for more milk production, especially in higher-cost regions. This is a system with real costs to milk buyers and sellers in terms of inefficiencies and putting incentives for innovation behind a heavy veil of regulations. Program administrators do a remarkable job trying to adjust to market forces within the limits of the regulations, but they cannot match the power of open competition and the incentives that competition creates. The FMMO system has far outlived whatever usefulness it once had.

The new dairy income support plan, the Margin Protection Program (MPP), represents a dairy income subsidy, and redistribution across farms,
in the guise of risk management. It suffers from the same basic deficiencies as the rest of the US Department of Agriculture (USDA) risk management complex of programs, including crop insurance programs the Risk Management Agency administers. Several recent AEI reports have documented concerns with these programs.

Here I pose the same basic question that applies to USDA-subsidized insurance programs in general. What broad public purpose is served by offering heavily subsidized insurance to farm businesses that choose not to buy such insurance if offered without substantial subsidy? Milk producers undertake myriad activities to mitigate production and financial risk. Of course, dairy farming remains a risky business. But that fact in itself is not a rationale for subsidy. Without the MPP subsidies the United States may produce somewhat less milk, which would mean somewhat lower exports. But reduced dairy subsidies would mean that those resources would be put to use elsewhere in the economy where they would be more productive.

Removing subsidy programs and protection does not mean removing government from providing documented public goods that help support the dairy industry. Market information, research and development, and help in removing barriers and subsidies in other countries are all important roles for government that will facilitate a strong and resilient American dairy economy.

The US dairy industry is now competitive in world markets. It will be even more competitive, and consumers, producers, and taxpayers will gain if we cut the government red tape that restricts efficiency and keeps the milk industry from being even more innovative. The industry has made remarkable economic and policy progress. It is time to finish the project and set the cows free.
Dairy Policy Progress

COMPLETING THE MOVE TO MARKETS

Daniel A. Sumner

The US dairy industry, which has long been an important and central part of American agriculture, has made remarkable gains over the past 30 years. Productivity has risen rapidly, and competitiveness has improved for both dairy farms and processing firms, many of which continue to be farmer-owned cooperatives. These gains have facilitated a shift from milk markets that were dominated by government regulations and subsidies to a much more self-reliant and resilient dairy industry.

In the 1980s, milk policy used high tariff walls and import quotas to keep milk products from the rest of the world out of the United States while using export subsidies to dump domestically produced milk products into world markets. The government policies dominated in domestic milk markets as well, with high congressionally mandated minimum prices implemented by the USDA’s purchase and storage of processed dairy products. When purchase and storage became excessively expensive, the USDA initiated a program to buy whole dairy herds and kill the cows while banning the dairy producer from producing milk.

In subsequent years, improved dairy farm and processor productivity and competitiveness, along with a recognition that federal dairy policy had failed to create or maintain an economically healthy industry, facilitated the shift away from many, but not yet all, of these policies.

This report summarizes the economics of the US dairy industry and recent US dairy policy. These summaries provide the background needed to evaluate current dairy policies and assess the likely implications of a new and more market-based US dairy policy.

AEI has had a long tradition of evaluating dairy policy as a part of its broader program of work on agricultural policy effort.

The current dairy farm policy in the United States revolves around two major programs. The longstanding (around since the 1930s) Federal Milk Marketing Order (FMMO) program covers most regions and regulates minimum prices buyers must pay based on the “end use” of the milk. Under the FMMOs, buyers must pay a higher or lower price for milk depending on whether they are using raw milk to make cheese, yogurt, or fresh beverages, among myriad other products. Farmers receive regionally determined and regulated weighted averages of these buyer-paid prices. California, the state that produces the most milk, has its own similar program, but it may soon join the FMMO system.

The second major component of current US dairy policy is the Margin Protection Program (MPP), which only began with the Agricultural Act of 2014. The MPP is government-subsidized (net) revenue insurance that covers shortfalls in the difference between a national average price of milk and a USDA-calculated average cost of feed used to produce milk. The MPP has been operating for only a few years, has not satisfied its producer advocates, and has not been widely used by dairy farms.

In addition to these two major programs, US dairy policy relies on several old and new measures, including some residual trade barriers. Import barriers used to be central to US dairy policy, but as discussed below they are now mainly an annoyance. US dairy farms continue to use agricultural policies such
as laws and regulations that (1) benefit farmer-owned cooperatives, (2) facilitate and subsidize domestic and international market promotion, and (3) subsidize milk purchases in schools; for pregnant women, infants, and preschool children; and some minor programs. Finally, the 2014 Farm Bill created a new but up to now unused dairy product donation program that would authorize government purchases of dairy products when the milk margins are low.

This report does not consider or evaluate environmental and related policies that affect milk supply and cost. Many environmental regulations, such as those dealing with local air quality, water quality, animal care practices, and greenhouse gas emissions are probably the government policies that matter most to many dairy farms and milk processors. Some of these state and federal policies raise milk production and processing costs substantially and must be subject to careful analysis to assure that the environmental benefits match the economic costs.

After reviewing the remarkable productivity improvements and structural changes that have occurred in the US dairy industry and describing the contemporary policy environment, I argue that the current slate of dairy programs does little to benefit the industry and that there is little rationale for continuing the programs. I see marketing regulations that raise the price of beverage milk products as counter to public policy principles and that they have negative consequences with little benefit. They raise prices to consumers, especially children, who consume fresh beverage milk, and the programs do little except redistribute revenue among producers. Of course, milk and feed prices will continue to vary from month to month and year to year, but I find that government efforts to mitigate the consequences of such variability are likely to be counterproductive. I note that, as for crops, unless policies to deal with variability are accompanied by substantial subsidy, they do not generate much farm participation. I also note that, as with other farm subsidies, there is no rationale for regular and sustained income transfers from taxpayers to dairy farms.

Finally, then, I argue that moving to a more open market with less government encumbrance would allow the US dairy industry to become stronger.

The US Dairy Industry Is Large, Important, Diverse, and Complex

The farm value of milk was about $40 billion in 2017 and contributes about 10 percent of total US farm cash receipts. Milk is among the most important farm commodities in most states and the top farm commodity in terms of cash receipts in several important agricultural states, such as California and Wisconsin. Milk is also the top farm commodity produced in several of the smaller agricultural states, such as Vermont. The major milk-producing states range from New York and Pennsylvania in the East to Wisconsin and Minnesota in the Midwest to Idaho, New Mexico, and California in the West. Thus, the dairy industry is geographically diverse and important.

Two remarkable transformations in the milk industry have occurred in the past three decades. Table 1 documents these changes. First, from the early 1980s through 2007, milk production and productivity grew rapidly in the West, as represented by California and Idaho in Table 1. From 1984 through 2007, the number of cows doubled in California, and milk production grew by 250 percent as milk production per cow increased by about 50 percent. Growth rates were even faster in Idaho, which emerged as a major dairy state. Over the same period, milk production stagnated in the East and Midwest as represented in Table 1 by Wisconsin and New York, where milk per cow increased rapidly, but numbers of cows declined just as rapidly. Between 2007 and 2017, these trends have reversed. California has had stagnant milk production with slight declines in cow numbers and slight gains in milk per cow. Idaho experienced much slower growth in cow numbers and milk per cow than in the previous period, and it added less than 30 percent to milk production compared to more than 110 percent in the previous decade. Remarkably, Wisconsin and New York held cow numbers steady as production per cow rose by about 25 percent. The result is that now California, still the largest dairy state by total production, has less milk per cow than the other three dairy production leaders.

Milk production is central to the agricultural economy in the United States. Dairy farms buy and feed
grains, especially corn, and oilseeds, especially soybeans. Dairy farms also use huge quantities of forage crops, such as alfalfa hay, other hays, grain silage, and even almond hulls. The US feed industry relies on US dairy farms as a significant source of demand. Dairy demand for forage crops, which tend to be grown near dairy farms, is a major factor in determining the crop landscape in milk-producing regions. Milk tends to be processed near farm production, so milk production also generates considerable downstream economic activity. In many regions, therefore, the dairy industry accounts for much of the activity in the local agricultural economy, directly or indirectly.6

Milk marketing cooperatives owned by dairy farmers account for about 84 percent of the milk produced and marketed in the United States. K. Charles Ling reports on 132 cooperatives, many of them small local operations that either process their farmer-owners’ milk or, more often, represent the marketing of member milk to other processors, without actually doing any processing themselves.7 While most cooperatives are small, some are large, well-known national or regional companies such as Dairy Farmers of America, Land O’Lakes, Dairy Farmers Incorporated, and Darigold Inc. The top four cooperatives market about 40 percent of all milk in the United States, and the 20 largest cooperatives market about two-thirds of all milk.8 However, markets for raw milk from the farm are local because milk is heavy and perishable. So local market shares are also relevant, and in some major dairy states such as California and Washington, a few cooperatives market 80 or 90 percent of milk in the state.9

As with every agricultural commodity, features of the dairy industry are similar in some respects but different in others when compared to other farm commodity industries. As with eggs and some fruits and vegetables such as strawberries, milk is perishable and harvested every day. Harvest timing for milk is even more crucial given animal welfare considerations. Milk is more homogeneous than many commodities.10 Like several other commodities, much of

Table 1. Dairy Production and Productivity for Major Dairy States, 1984–2017

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<tr>
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<th>1984</th>
<th>1997</th>
<th>2007</th>
<th>2017</th>
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<td>699</td>
<td>627</td>
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</table>


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the milk in the United States is sold through farmer cooperatives. Also like many commodities, including grains and oilseeds, several end-use products are made from raw milk. The dairy industry also shares some of the features of the cattle feeding, hog, and poultry industries with respect to the change of farm size and migration of the industry across regions. It differs from those industries and is more similar to program crops in the heavy role of government programs in the dairy industry beginning in the 1930s.

**Dairy Productivity Growth and Structural Change**

The remarkable change in the US dairy industry in recent decades has stimulated much analysis and commentary for many years. Some of the increase in average dairy herd size parallels changes in other parts of US agriculture, but other features are specific to the dairy industry. James McDonald, Jerry Cessna, and Roberto Mosheim show that “midpoint herd size,” defined as that herd size for which half of all milk cows are in herds that size or larger, grew from 80 cows in 1987 to 140 cows in 1997, 570 cows in 2007, and 900 cows in 2012, according to Census of Agriculture data. Western states continue to have larger dairy farms, but even in midwestern states such as Michigan and Indiana, more than half the cows were in herds of more than 499 cows. In 2012, according to the USDA Census of Agriculture, about half the national milk cow herd was on farms with 1,000 cows or more, and about three-quarters was on farms with 200 cows or more. Ten years earlier, the 1992 Census reported that less than one-third of the milk cows were on farms with 200 cows or more.
Since 1984, milk production in the United States has risen by almost 60 percent, reaching about 216 billion pounds in 2017 (Figure 1). This growth has been made possible by an 83 percent increase in milk production per cow to about 23,000 pounds per cow. The increase in milk per cow has overwhelmed a 13 percent reduction in the number of milk cows to about 9.39 million. The 13 percent decline in milk cows occurred during the decade from 1986 to 1997, and the national herd has been roughly stable since (Figure 1). The increase in milk per cow has increased rapidly over the past 20 years. Among major dairy states, milk per cow has risen most rapidly in the Midwest, while growth has slowed in the West, especially California, which used to be a leader in milk per cow.16

The price of milk has declined in real terms in line with industrywide productivity growth. Figure 2 shows that since 1988 the national average “all-milk” price has fallen by more than a third from just under $27 per hundredweight (in 2017 dollars) to about $17 per hundredweight. Although the all-milk price has varied by up to $6 per hundredweight from year to year, there has been a stark downward trend in price over the past three decades. Farm milk is processed into many end uses, and, based on the regulations discussed below, beverage products (known in the regulations as Class I milk) command the highest price per unit and contribute to higher all-milk prices. Figure 2 also documents that the Class I utilization percentage has fallen by more than a quarter in just over two decades from about 42 percent in 1995 to about 30 percent in 2017. The decline of beverage milk demand has helped drive down all-milk prices and has caused other issues for milk policy and price regulations.

The increase in milk production, production per cow, and reduced cows per farm have accompanied substantial increases in labor productivity and lower milk production costs. Data from the USDA show that costs are substantially lower when the number of cows in the herd rises from a few hundred cows or fewer to 1,000 cows or more.

McDonald, Cessna, and Mosheim\textsuperscript{17} provide details on the national patterns by herd size of dairy resource use and costs per hundredweight. They use the USDA Agricultural Resource Management Survey (ARMS) data to document evidence of substantial economies of size. While these tables tell a revealing story, the causation from herd size to lower costs is not as clear, because herd size tends to be correlated with regional attributes that may also affect milk production costs. Moreover, for the smallest herds, farms with fewer than 500 cows, a substantial part of the production costs they incur are from cost imputed to unpaid family labor. The USDA cost data are consistent with observations that small dairy farms are either leaving the industry or getting even larger. These patterns are also consistent with data the California Department of Food and Agriculture compiled using different methods. For example, in the Southern San Joaquin Valley, herds of more than 1,500 cows have consistently lower costs per hundredweight than herds of 1,500 cows or fewer, even when farms use similar technology and are located in the same region of California.\textsuperscript{18}

Hired labor costs are higher for farms with larger herds, and the share of hired labor of all labor used on the farm is also higher. Farms with more cows rely on lower-cost hired labor for milking and routine chores.\textsuperscript{19} However, total labor hours per unit of milk and labor costs per unit of milk are lower on the larger herds despite farms with more workers paying higher hourly wage rates. Milk per cow is higher for herds with more than 500 cows but shows no pattern above that herd size in the national ARMS data. In the California data from the Southern San Joaquin Valley, milk production per cow is highest for the herds with between 1,500 and 2,400 cows and second highest for the even larger herds.

The evolution toward larger herds with lower costs has transformed the US dairy industry over the past 30 or 40 years. Most US milk production occurs on farms with more than 1,000 cows operated by owner managers who employ others to feed and milk cows while they concentrate on supervision and improving the operation. The policies of the past are not suited to the farms that produce most of the milk. The USDA and Congress have struggled to maintain a relevant role and nowhere more than in trade and trade policy as the United States has become competitive in global markets.

**Brief History of Recent Dairy Policy**

Just three decades ago, during the time of the 1985 Farm Bill, US dairy policy included:

1. Price supports for milk and government purchase and storage of processed dairy products;
2. Stock disposal policies that shifted government-owned products into domestic and international food aid;
3. High tariffs and strict quotas to keep out imports;
4. Export subsidies to allow exports to match foreign prices;
5. A “whole herd buyout” that paid farmers to sell their cows for slaughter, shutter their farms, and leave the dairy business;
6. Dozens of regional marketing orders that regulated milk prices by end use and pooled prices paid to farmers; and
7. Food and nutrition programs that subsidized domestic consumption of fluid milk products by children.

All but the last two of these policy features have been removed or are no longer significant. The first five policies were linked by the idea that farm prices for milk needed to be higher than the market would generate, thus the government should set those higher
prices. When high government-set prices became incompatible with rapidly improving dairy productivity, support prices were allowed to decline (in real terms) so that eventually they did not interfere with market prices except in rare cases. With price supports no longer relevant, storage programs, surplus disposal, export subsidies, and supply controls also became redundant.

In place of binding support prices, a decade or so later, programs were introduced that used payments to dairy farms to make up the revenue difference between a government-determined price and the market price. The 1996 Farm Bill authorized the Northeast dairy states to begin a program of payments for farms in that region that was followed by Milk Income Loss Contract Payments that started with the 2002 Farm Bill. This direct payment program has also now faded away. Finally, after three decades in which the economics of US milk production and marketing were transformed, the 2014 Farm Bill formalized the recognition that US dairy policy was in a new era.

**Dairy Trade and Trade Policy**

Decades ago, government price supports and federal purchase programs diverted milk supplies into government-held stockpiles of cheese, butter, and nonfat dry milk and into subsidized disposal programs. Eventually, as dairy farms and processors became more efficient, government commodity programs became less intrusive, and global demand increased, the United States emerged as a major net exporter of several important processed dairy products. Currently, the United States is among the leading commercial dairy exporters while also importing selected products.

On average, US processors export about 14 percent of domestic milk production—a share that has fluctuated from about 12 percent to about 17 percent each month over the past five years. Meanwhile, imports have accounted for the equivalent of between 3 and 4 percent of US production. As a share of production, exporters ship more dry milk powder out of the United States than either cheese or butter. Cheese imports are still significant, and for some specialty cheeses, imports have sizable shares of the market.20

Top export products by volume are powders of nonfat milk, whey products (by-products from cheese manufacturing), cheese, butterfat, and lactose. Top dairy export destinations by value are Mexico, Southeast Asia, Canada, China, South America, and South Korea.21 As with other farm commodities, most of the top dairy markets for US dairy exports have free trade agreements with the United States, and three of the top six markets (Mexico, Canada, and South Korea) are currently subject to “renegotiation” of those agreements. A significant exception, China, is a major buyer of US whey products and skim milk powder and is also the subject of some controversy with the United States mostly over non-agricultural trade issues.

With recent changes in EU policy that eliminated production quotas and removed explicit export subsidies, several EU member countries are now also commercial exporters that rival the United States, New Zealand, and Australia in global markets. Australia and New Zealand have low domestic subsidies and no substantial trade barriers for dairy products. The EU, like the United States, has residual dairy subsidy programs and maintains import barriers. Nonetheless, global markets for relatively standard traded dairy products such as skim milk powder, standard cheese, whey products, and butter reflect vigorous competition. For major traded products, the four major traders have domestic prices that track each other closely over time.22

As noted above, US price support policy precluded commercial exports so long as the US government was ready to buy dairy products at prices higher than those available in export markets. As support prices came down in real terms, however, US food processors had the potential to export dairy products for which they could be competitive. Two further conditions have contributed to expanded exports.

First, the global market for US dairy products has grown because of reduced border barriers, income growth among potential importers, and limits to production expansion in New Zealand and Australia.
Global imports have expanded because of income growth, especially in Asia and Mexico; free trade agreements with Korea and other countries; and reduced barriers in other importing countries. Moreover, with heavily pasture-based dairy systems, both Australia and New Zealand have found it difficult to expand enough to supply growing markets.

Second, the United States would have remained a tiny force in global exports if the rapid productivity growth in milk production and dairy processing had not allowed domestic costs to fall substantially. Farm-owned dairy cooperatives have been major participants in the export of milk powder and butter. Commercial cheese companies, some also owned by dairy farmers, have been significant exporters of cheese and whey products. Exports have been more important to western farms and processors because of their access to Mexico and Pacific ports and their distance from large US population centers in the US East and South.

While US firms have expanded commercial exports of dairy products and as US domestic prices are on par with those of other exporters, the United States has maintained hundreds of tariff-rate quotas (TRQs) that are designed to limit imports. A TRQ is a combination of a relatively low, often zero, tariff for a specified quantity of imports and a high, often prohibitively high, tariff for any additional “over-quota” imports. TRQs are often designated for specific tariff lines (for example, Blue Mold Cheese), and they are often assigned to exports from specific countries. TRQs are allowed under World Trade Organization agreements and several free trade agreements. Many of the exporter-specific TRQs have “fill rates,” the share of the limit actually imported, of zero or near zero in recent years.

US barriers for dairy products do seem to limit imports in instances in which a country-specific TRQ fills and the general TRQ available to all countries also fills. This may occur even when some of the country-specific TRQs for that item, say a specialty cheese, have not filled. Overall, TRQs do limit US imports but do not keep US dairy prices above world prices because the US exports many of the same product categories that it imports. For butter, commercial exports are about 3 percent of production, and imports are slightly less. For dry milk powder, exports are far larger, and imports are tiny. For cheese, the US imports many specialized and high-priced cheeses and exports more generic cheeses. In all these cases the limits on imports seem to have small aggregate impacts, and although import limits may lift the fortunes of particular companies, relaxing the mind-boggling array of TRQ regulations would have negligible aggregate impact on the US dairy industry.

The benefit of a US dairy industry as a champion of free trade could be large. The US could then join other major exporters in pushing for more open markets in every international forum and no longer be vulnerable to claims of hypocrisy and lack of consistent measure on dairy trade. The remarkable gains the US dairy industry has made allow it to leave behind its legacy of protection. The next farm bill could begin the process of clearing away the regulatory clutter that impedes dairy industry competitiveness.

Federal Milk Marketing Orders

The FMMO system in the United States dates from early in the New Deal era of the Great Depression in the 1930s. After the Supreme Court ruled a first version of the program unconstitutional, the Agricultural Agreement Act of 1937 authorized the USDA to intervene in the dairy markets only if requested by dairy farms in a given region. After the USDA develops a proposed marketing order for a region, it is applied only if favored by farms selling two-thirds of the Grade A milk in that region in a referendum in which cooperatives are allowed to “block vote” for their members.

The most recent major change to law controlling the FMMO system occurred in the 1996 Farm Bill when the USDA was instructed to reduce the number of orders from more than 30 to between 10 and 14. The resulting changes in the regulations specified 10 marketing orders, altered how minimum prices were calculated, and made other technical adjustments. The rule went into effect on January 1, 2000. Subsequent farm bills, including the 2014 Farm Bill, have retained the revised FMMO system and authorized conditions
under which California may join the FMMO system. Creating a California FMMO remains an active consideration.

Figure 3 shows the regions covered by the 10 active FMMOs and regions not covered. Some of the area the FMMOs do not cover produce and process little milk, but others are significant milk regions. Among major dairy production states, California operates a state-authorized marketing order, which is similar to the federal orders, and Idaho is not regulated by a marketing order. Some small milk-producing states and parts of other states are covered by state marketing orders rules. In all, about two-thirds of US milk is regulated by the FMMO system and another 20 percent by state milk marketing orders that are similar to the federal orders.

The long-standing stated “objectives of the FMMOs are as follows:

- To promote orderly marketing conditions in fluid milk markets,
- To improve the income situation of dairy farmers,
- To supervise the terms of trade in milk markets in such a manner as to achieve more equality of bargaining between producers and milk processors, and
- To assure consumers of adequate supplies of good quality milk at reasonable prices.”

Several of these objectives suffer from vagueness of terms such as “orderly marketing,” “more equality

Note: F.O. = Federal Order. Blank areas of the map are regulated by state orders or are unregulated. Alaska and Hawaii are not in federal orders.
of bargaining,” and “reasonable prices.” For most of the American economy, market forces establish prices and create incentives for producers and consumers. For example, the USDA does not operate elaborate price and marketing regulations for strawberries, celery, eggs, corn silage, or alfalfa hay. The one objective that links the FMMO system to other farm programs is “to improve the income.” I show in what follows that the price regulations under the FMMO system tend to not only shift revenue from consumers to farmers by raising farm prices of milk used for fluid products but also have many other consequences.

More fundamentally, a natural question is: Why are elaborate arrays of government regulations needed to meet such objectives for milk markets and milk producers? To consider this basic question, I draw on the insights of a standard analytic framework used by economists to examine pool pricing presented (see the appendix) and provide a description of how the FMMOs actually operate. Even with this level of detail, we must abstract from much of the complexity of the regulations. Indeed, much of the intricacy of the milk marketing orders has developed in attempts to avoid unintended consequences of incentives created by the regulations themselves.

**Basic Economics of Milk Marketing Orders.**

Dozens of studies have addressed the economic effects of milk marketing regulation in the United States.24 These studies and many more helped establish some economic implications of the FMMOs: Milk marketing orders transfer income from milk consumers to dairy farmers, resulting in a net loss to society. They stimulate milk production and divert production from fluid products into hard products. This research has explored many conceptual and empirical issues and has become more technical and elaborate over the years.

A milk marketing order sets minimum prices that processors must pay for raw milk depending on the product for which the processor uses that milk. FMMOs distinguish between four end-use classes: beverage products (the highest price), soft and frozen products, cheese and whey, and butter and powder. Revenue from each milk class is pooled, and participating producers receive a marketwide average, or blend, price. The details of milk pricing rules have evolved over time, but the key elements of price discrimination and revenue pooling remain.

The quantity and share of milk used for manufactured products is larger under the FMMO pricing system for two important reasons. First, under FMMO the government sets a high price for fluid milk products that tend to stay in the local regional market. The higher price discourages consumption of those fluid products, and the milk that would otherwise be used for locally consumed products must shift to processed products, which increases supply of those products.

The second reason why the FMMO system implies more milk for manufactured products is that the policy stimulates more raw milk production on farms. As a matter of policy, all farms in the system explicitly receive a weighted average “pool” or “blend” price that includes the benefit of the high (government-set) price of milk used for fluid products. That means that even milk that is produced to be used for cheese and whey, or butter and dry milk powders, receives a price above that paid by the manufacturers of those products. That is, the farm receives more than the buyer pays for milk used for manufactured products, with the difference contributed by the fluid milk processors and milk drinkers.

Several simplifications are made in the graphical exposition in the appendix but not in more complex simulation models that are used for analysis of quantitative impacts of marketing orders. First, in the actual, complicated regulations, prices and quantities are specified separately for milk components—fat, protein, and nonfat, nonprotein components. These separate components are combined to generate the price of milk per liquid hundredweight to determine the price paid to the farms. Second, farm milk prices often include some over-order milk price premiums paid directly by the buyer to the farm supplier (or cooperative of farmers) to encourage delivery to a particular buyer. That is, regulations specify price minimums and do not restrict payments above the minimums. Milk hauling costs, milk sanitation, and other farm-specific considerations affect the price farmers receive and processors pay. Despite the
simplifications used in the exposition in the appendix, the structure introduced captures the essential features, subsidy elements, and supply implications of the milk marketing order system.

In practice, FMMOs adjust minimum prices on a monthly basis for components of fat and nonfat solids for Class III milk (used for cheese and whey products) and Class IV milk (used for butter and dry milk powder) based on specific market prices of butter, nonfat dry milk, cheese, and whey products. The market prices of products and the resultant implied component prices used in the minimum milk price calculations do not differ across orders and reflect a national (and international) market for these products and components. The minimum prices of Class III and Class IV milk components are tied directly to market prices of highly traded processed products. The minimum prices of milk fat and skim solid components are market determined, which ties the minimum farm price of milk to these product markets.

Class II (soft and frozen products) and Class I (fluid products) component prices are set by simply adding region-specific differentials to the Class III and Class IV component prices. Thus Class I and Class II minimum prices are higher than those that would exist without the policy. In the details, the Class I price per hundredweight is calculated using the component prices for the higher of the Class III and Class IV skim milk component (and the common butterfat component). Importantly, the minimum prices for the subsequent month are based on the recent past market prices of the Class III and Class IV products. The high prices reduce quantities of fluid products demanded by consumers, and therefore less milk is used for these locally consumed products. Moreover, binding future minimum prices to past product price builds in sticky adjustments and additional flux to the markets.

Class II prices are tied only to the market price of nonfat dry milk, which is a Class IV product. In recent years, the Class II price was often below the Class III price because of the low price of nonfat dry milk compared to the price of cheese. Such price differences would not persist under market-driven pricing, given competitive pressures and arbitrage.

As noted above, markets for soft and fluid products are more local, and the quantity demanded for milk used in beverage products consumed locally is relatively insensitive to price changes. That means the higher price caused by the marketing order has relatively small effects on quantities demanded. The markets for the Class III and Class IV products in each marketing order, on the other hand, are national and international, and demands for those products are much more sensitive to price changes, meaning that pushing their prices lower results in relatively large increases in quantities sold.

The marketing orders also maintain a separation between the price paid for milk used for cheese and whey and the price paid for milk used for butter and dry milk powder. In recent years the price of cheese and whey have been relatively high compared to the price of dry milk powder and butter. The result has been a higher price of Class III milk than for Class IV milk. For example, in December of 2016, the national average price of Class III milk was $17.40 per hundredweight, while the price of Class IV milk was $14.97. A few months later in April 2017, the price of Class III milk was $15.22 per hundredweight, while the price of Class IV milk was $14.01 per hundredweight. No such differentials would persist under a market-based price system, given competitive pressures and arbitrage. They reflect inefficiency losses of regulated prices.

The FMMO regions differ in how their milk is used and the Class I price differential. In the Florida order, more than 80 percent of the milk is used for Class I products, and the Class I price differential is $5.40 per hundredweight. At the other extreme, in the Upper Midwest order, about 10 percent of the milk is used for Class I products, and the Class I price differential is $1.80 per hundredweight. Milk is more expensive to produce in Florida, and without the marketing orders, little milk would be produced there. Incentives for geographic arbitrage are standard market forces that would move milk to higher-priced markets. The FMMO system attempts to duplicate such a standard market result with an array of minimum prices and differentials. Of course, government-set differentials can never precisely mimic market forces. The result is that additional high-cost milk is produced in places
such as Florida, higher prices are charged to consumers, and less milk is produced in lower-cost regions that are better suited to milk production.

**Example of Impacts of a Marketing Order on Prices and Quantities.** By setting the price of milk used for Class I products above that of identical milk used for Class III and IV products, the FMMO system causes beverage milk to be more expensive and cheese, whey, butter, and milk powders to be less expensive to buyers. As discussed above, the diversion of milk across uses and the incentive to produce more milk cause economic losses to both consumers and the economy as a whole. The magnitude of the diversions and the losses depend on the shares used for each product, the size of the price differential, and the relevant impacts of price changes on quantities supplied and demanded.

In the Northeast FMMO for example, the Class I price has been about 40 percent above the Class IV price. Given the usage shares across classes, the blend price has been about 20 percent above the Class IV price. Using a low-price elasticity of demand (the percentage change in quantity demanded for each 1 percent change in price to buyers) for milk used in Class I products (which is about –0.2) and a moderate intermediate term supply elasticity (the percentage change in quantity supplied for a 1 percent change in the price to producers) for raw milk (say 2.0), these price differences translate into about 8 percent less fluid milk use and about 40 percent more milk produced in the region. Putting these impacts together, the marketing order has a substantial impact on the use of milk for manufactured products in the Northeast.

In states such as Idaho (or California and Wisconsin), marketing orders have much smaller potential impacts on the diversion of milk across uses and incentives for additional milk production. The impacts are small because in these states only a small share of milk is used for Class I products, and there is a small potential Class I differential because so much of the milk is shipped out of the area as processed products. With say 15 percent of milk used for Class I and a 15 percent Class I differential, the extra revenue from diversion is just over 2 percent (0.15 x 0.15 = 2.25 percent). Thus, in the regions that are most milk intensive and where most of the milk in the United States is produced, marketing orders do the least to generate additional milk income. These regions also face complications in moving milk out of the region for higher price uses, and the array of complicated marketing order rules may cause more disruption to milk market innovation.

A caveat to these quantitative implications is that in many regions where marketing orders set minimum prices, buyers pay significant over-order premiums (OOPs) for milk used for fluid products and cheese. Marketing order minimums do not set actual market prices, and buyers often pay more than the minimums, and since the OOPs are not pooled, they provide incentives directly to individual farms to deliver their milk to a specific processor. A second caveat is that in federal orders, some milk processors may choose not to participate in the marketing order. These buyers may operate “non-pool” plants and buy milk directly from producers. Of course, non-pool plants must pay enough to attract farms that would otherwise receive the blend price if they deliver to a pool plant, and the blend price is usually above the minimum price for Class III and Class IV processors. Sometimes, however, when the blend price is low and the minimum Class III or IV price is above what would otherwise be a market price, plants remain outside the order.

**Current Issues Facing the FMMO System.** No changes to FMMOs are required in the next farm bill. Like crop insurance and some other farm policies, they are not subject to periodic reauthorization. Nonetheless, even if the system remains largely in place, changes are likely on the horizon. These include a California FMMO, complications associated with organic milk, and how to adjust FMMOs to facilitate forward pricing and other risk management tools used by milk producers.

The most pressing issue now on the FMMO agenda is the potential for a federal California order. After years of discussion and prior legislation facilitating transition to a federal order for California, the USDA held public hearings on a California order throughout much of the fall of 2015. Based on this record, the
USDA published its “recommended decision,” essentially a proposed marketing order in the Federal Register on February 14, 2017. One stipulation was that the federal order would allow continuation of the California-specific policy that allocates some of the milk revenue to producer owners of California milk “quota” only if the system was operated and regulated by California rather than federal rules. The California Department of Food and Agriculture held a referendum of producers to gauge their approval of a California-operated quota program to accompany the federal order. In December 2017 the USDA announced that the requisite share of producers representing the requisite share of milk had voted and approved creating the program. With this approval, the stage is set for the USDA to hold a vote among producers on a specific set of FMMO regulations for California.

The vote is likely to occur relatively early in 2018. The threshold issue is probably whether farm milk prices are likely to increase under the California FMMO. A longer-term issue is whether higher farm milk prices imposed by a marketing order would be sustainable, given relatively high processing costs in California and California’s reliance on the sale of standard processed products in national and international markets. Among the features of particular interest in a California FMMO is whether California cheese plants are likely to operate outside the marketing order and, if they do, how that would affect the pool prices. Cheese plants now offer OOPs to farms that deliver to them, and they may prefer this practice to higher pool prices and diluted price incentives for farms to deliver to them. The issue of allowing processors to leave and remain outside the pool may be contentious in California.28

In recent years organic milk has grown to about 6 percent of fluid use, while overall beverage milk consumption has declined. The challenge for the FMMO system is that the Class I differential and minimum prices are irrelevant for organic milk, which, nonetheless, must remain in the system. Options might be to let organic milk producers opt out of the FMMO system or set up separate orders for organic milk, but both these options might encourage other producers who claim their milk is special also to want to opt out. The broader systemic question is that, as conventional milk beverage products become an ever smaller share of milk usage, does the FMMO system cause more complications and added costs than it is worth in terms of milk revenue generated by price discrimination?

One of the most powerful features of markets is that they aggregate participant views of likely supplies and demand and implications for prices.

Two broader issues for milk marketing orders are that they likely make milk prices more variable and reduce the ability of producers and processors to manage price variability. First, minimum prices the FMMOs set use recent prices of manufactured products to set future minimum prices by proposed end use for milk on the farm. One of the most powerful features of markets is that they aggregate participant views of likely supplies and demand and implications for prices. Markets are inherently future oriented. History may be a guide, but there is nothing rigid about the relationships, and market participants have substantial incentives to find and use all relevant information. Formulas simply cannot replicate performance of participants with incentives. That means the FMMO prices send the wrong signals to farms and buyers and cause undue fluctuation as the markets must compensate those signals. The FMMO system regulators are remarkably effective with the tools they have, but they cannot replicate markets.

All agricultural markets have variable supplies and demands and hence variable quantities and prices.
Market tools have evolved to allow sellers and buyers to mitigate or offset quantity and price variability that is costly to them. A problem is that marketing order rules make using some of those tools—such as features of long-term contracts, forward pricing, futures and options, and even on-farm production adjustments—more complicated. Regulators have recognized some of these issues and designed special programs (such as the Dairy Forward Pricing Program) to facilitate certain types of contracts. However, Class I milk cannot participate in forward pricing, and risk management for buyers of Class I milk is made more difficult by the FMMO rules. Month-to-month and year-to-year price variability is endemic and natural in agriculture. By restricting options for both buyers and sellers and inserting government regulations into every transaction, the FMMO rules seem to exacerbate costs of dealing with such variability.

The FMMO system is an elaborate and sophisticated set of complicated rules and regulations. It is hard to see how they make milk markets more “orderly” except in the sense that they are now controlled by active government agents rather than forces of supply and demand. It is also hard to picture that milk producers and processors would fail to assure an adequate supply of beverage milk products for consumers. That problem has not plagued the supply of lettuce and strawberries or beverages such as orange juice, soymilk, and almond milk. As to bargaining, some of the largest food companies in the United States are dairy farm cooperatives that bargain for their farmer members. And in local markets the farm cooperatives are often larger than the local cheese companies that buy the milk. No evidence indicates that dairy farms are especially vulnerable and that the FMMO system is effective protection in any case.

The bottom line is why, 30 years after the fall of the Berlin Wall and decades after China abandoned rigid Mao-style central planning, the United States maintains Soviet-style milk pricing. The most likely answer is that some farms and even some processors gain from the system at the expense of other producers and consumers. These winners take advantage of political inertia and fatigue among those who would benefit from change.

The Margin Protection Program: An Unpopular Policy in Search of Repair

As noted above, the 2014 Farm Bill removed both the long-standing dairy price support program and the direct payment programs for dairy farms that had tried to provide subsidies after the price supports proved untenable. The problem with price supports was that, if the support price was high enough to satisfy the producer lobby, the program stimulated production of efficient farms, distorted markets, precluded commercial exports, and was prohibitively expensive. Payment schemes (such as Milk Income Loss Contract) substituted deficiency payments to farms for market price interventions but faced the problem that they provided only relatively small per-farm subsidy, even with low dairy-net incomes. So these programs also were not popular with producers. The basic problem for subsidy programs is that the dairy industry is large, diverse, and has had remarkable productivity gains concentrated among larger farms. This means any program that provides substantial support to the high-cost farms and is therefore popular among those farms and their advocates is also likely to become expensive for US taxpayers.

The genesis of the MPP that replaced price supports and payment schemes derives from the experience of the previous decade. Dairy farms experienced periods of low and moderate milk prices but disastrous economic conditions in 2009 and negative net revenues again in 2012. In both cases the problem was as much because of high feed prices as low milk prices. The 2009 year was particularly severe. As McDonald, Cessna, and Mosheim document in detail, even the largest low-cost dairy farms experienced negative net revenue in 2009. The dairy industry, as a whole, shed equity and acquired debt, and many farms did not have enough cash flow to service the debt.

The MPP is vulnerable to the same basic problem that has doomed other recent dairy subsidy programs. It seems unpopular with dairy advocates because it does not generate substantial income subsidies. But the budget costs of providing substantial subsidies each year to such a large industry that has not recently had a large share of the farm subsidy budget does not
seem feasible. To see the income impacts of the program clearly, we must review a few program specifics and outcomes.

The MPP authorizes payments to enrolled farms when the USDA-calculated margin per hundredweight falls below the target margin selected by the farmer. A $4.00 per hundredweight margin is available with only a nominal enrollment fee and no premium payment. For higher-insured margins farmers pay a premium scaled to alternative margins that increase in $0.50 intervals from $4 up to $8 per hundredweight.

The definition of the legislation-defined margin used in calculating possible payments is an approximation of the actual farm-based margins that uses readily available national data from the USDA. The milk price used in the calculations is the national all-milk farm price that is not adjusted for any regional differences or any farm-by-farm differences due to quality. The feed-cost index is based on a linear formula of coefficients reflecting share of costs of each of three feeds in an average dairy operation. These coefficients are multiplied by the national average price of corn, soybeans, and alfalfa hay. The coefficients were calibrated to set the feed cost in the base period equal to the average feed cost and movements in calculated feed cost from month to month and to reflect changes in the feed prices. It is important to note that this calculated margin reflects, in rough terms, the movements in the milk price minus cost of feed and does not reflect the true margin for any particular farm or group of farms in recent years. The idea was simply that the movements in the USDA-calculated margin would have a relatively high correlation with the economic fortunes of dairy farms in the United States.

Farms may enroll between 25 percent and 90 percent of their covered production history. The premium per hundredweight is lower for the first 40,000 hundredweight of covered production history. Table 2 shows the premium schedule that is currently operative as written into the legislation. An important feature of the schedule is that premiums were not calibrated by actuaries to general fair premiums with specific subsidy rates as is the practice with USDA Risk Management Agency crop insurance programs. The premiums for each coverage of production history and protection level are written into law, with some consideration of projections of government budget costs over the five-year life of the farm bill.

Table 2 shows how much premiums increase as protection level increases. This reflects estimates associated with the history of milk-price-minus-feed-cost margins that had occurred in the years before the 2014 legislation. Second, premiums are much higher for the higher hundredweight of coverage, which would be demanded by larger dairy farms. These higher premiums for larger farms are especially pronounced at higher protection levels. At a protection level of $6.50 per hundredweight, a farm would pay $0.20 per hundredweight more (more than triple) for insured milk in excess of 40,000 hundredweight. At the highest protection of $8.00 per hundredweight, a farm would pay $0.885 per hundredweight more for the covered milk over 40,000 hundredweight. The premium rate differences are unlike the laws and regulations governing crop insurance and reflect purely political forces (associated with regional differences) that are unfavorable to larger dairy farms.

We now have three years of experience with the operation of the MPP and can assess how the program has performed so far. First, consider enrollment. In 2015, 24,748 of 45,344 eligible dairy operations signed up for the program, with 44 percent of those enrolling at the free minimum margin of $4.00 per hundredweight and 56 percent of those enrolled paying a premium. Thus, overall, 55 percent of operations enrolled, and 31 percent paid a premium. In 2015, about 81 percent of production enrolled, and about 33 percent enrolled at higher than the minimum. The figures for 2016 and 2017 show gradually fewer farms enrolled at premium paying levels. In 2017, most eligible farms enrolled, but essentially all those producers and their milk coverage enrolled at the minimum $4.00 per hundredweight coverage and paid no premiums.

Farms that have chosen not to enroll or to enroll at the no-premium level have made appropriate financial decisions in the sense that in none of the years was the program payoff enough to be profitable. Of course, if the goal of the program is risk management, it does not seem to have attracted farms to regularly...
pay premiums, as they do for their unsubsidized insurance policies that cover farm machinery and buildings on the farm. The MPP seems to have the same pattern of participation as subsidized federal crop insurance, where unless reliably profitable, farms do not participate or participate at the minimum coverage that does not require a premium.37

Several analysts have examined how the MPP would have performed for dairy farms if the program would have been in operation and if farms would have participated in prior years.38 Much of the data and analysis were provided as the MPP was being finalized to help producers with their enrollment decisions. Using the USDA-provided data and estimates of projected milk and feed prices, an analyst may ask what the payoff to the program would have been under assumptions about coverage and what the farm expected about prices.39 The USDA provides useful enrollment information for dairy farms that also includes historical information that allows them to assess participation strategies that would have maximized net returns in prior years. The results depend on the amount of milk coverage and whether a farm uses ex ante forecasts of milk and feed prices or assumes the farm has perfect foresight in selecting what turned out to be the optimal coverage to maximize returns, rather than accounting for any risk management considerations.40

Based on ex ante estimated returns, the optimal MPP choice would have been for minimal coverage in half the years over the past decade, even for small farms with less than four million pounds enrolled (equivalent to less than 200 cows). The enrollment years were 2009 through 2013 when $8.00 coverage would have been the net income maximizing choice. For actual returns, there are only three years in which paying premiums to buy coverage would have been optimal: 2009, 2012, and 2013. The same pattern applied to a large farm covering 20 million pounds of annual production.

It is useful to ask how much contribution to the farm total revenue and farm margin of milk revenue over feed cost would have been contributed by MPP benefits. In most years the payoff would have been zero, but in a few years, especially 2009 and 2012, the net payments from the MPP would have been large. In summary, for small farms, the MPP would have contributed about 2.0 percent to total revenue if the farm followed the projected returns in deciding how to enroll. If the farm could have selected the net revenue

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maximizing enrollment strategy each year, the program would have added 4.0 percent to revenue. Of course, the estimated shares are much higher for the margin over feed costs. The average is 5.7 percent of revenue and 12.0 percent of margin if the optional coverage were chosen each year. For a farm covering 20 million pounds, the impact is about 0.8 percent of revenue following projected returns for enrollment and 2.8 percent of revenue if the best coverage choice were made each year. The large farm would have gained about 2.3 percent of revenue following the projected returns and about 8.3 percent of revenue if the farm could have made the best coverage choice each year.

These calculations show that even a program that would pay off in only a few years in each decade can be profitable to farms. In the case of the MPP, given considerable information available before the farms must make an election decision, it is likely that they may pick years in which margins are likely to be low during the year and years when margins are likely to be high. In that case the estimates that the program can account for between 1 and 4 percent of long-run dairy farm revenue seems within the plausible range. These calculations suggest that the MPP has provided significant additions to expected revenue and that additional revenue would be available in periods during which farms would otherwise experience low or negative net revenue.

The MPP contributes to a long-run increase in expected net revenue for participating farms and smoothing of revenue variability. These impacts of the program suggest the potential for significant supply response. The impacts on expected revenue and an applicable supply elasticity of about 2.0 indicate that added milk production in the long run may be 4 percent or more. This is in the same order of magnitude as estimates of the impact of crop insurance programs for field crops administered and subsidized by the USDA Risk Management Agency.

The bottom line considerations about MPP also apply to the Livestock Gross Margin-Dairy insurance program offered by the USDA through the Risk Management Agency. Indeed the same considerations apply to USDA-subsidized agricultural insurance programs in general. What broad public purpose is served by offering heavily subsidized insurance to farm businesses that choose not to buy such insurance if offered without substantial subsidy? As with other farms, milk producers undertake myriad activities to mitigate production and financial risk. They operate well-managed herds to reduce disease and other supply-side risks, they buy feed with forward contracts or use markets to hedge against future feed price increases, they diversify into other farm enterprises, they vertically integrate into feed production and cooperative marketing, they have off-farm investment, and family members work at nonfarm occupations.

Of course, even with all these tools, farming, including dairy farming, is a risky business. But that fact in itself is not a rationale for subsidy. Without the MPP subsidies the United States may produce somewhat less milk, which would mean somewhat lower exports. But reduced dairy subsidies would mean that those resources (income taken from taxpayers) could be put to use elsewhere in the economy where they would be more productive.

Concluding Remarks

The recent history of milk productivity and dairy competition tells a remarkable and compelling story. The industry has been transformed by progressive farmers, processors, and marketers. Policy change has also been remarkable. Outmoded policy ideas were simply no match for industry realities. The 2014 Farm Bill cleared away some of the policy thicket, but more remains.

The first policy change is not necessarily part of the farm bill process, but it could be. It is time to eliminate US dairy product trade barriers. An uninitiated observer just counting tariff lines and the number of relatively high tariffs might conclude that there was a massive wall of protection behind which the US dairy industry cowered in fear of imports. But that image is an illusion. In fact, despite dozens of individual tariff lines and TRQs with high second-tier tariffs, the US exports a large range of milk products with no export subsidy, and the domestic price of milk and milk components in the United States is commensurate with
prices in other competitive exporters. For the most part, the tariffs are not binding or, alternatively, apply to narrowly specified sets of products and therefore have little or no aggregate impact. These residual effective high tariffs protect a few favored companies to the detriment of the industry as a whole. It is time for the United States to help fully open the two-way street to global dairy markets.

The FMMO system also does not have to be an issue for a farm bill, but it has been in the farm bill in the past and could be again. The FMMO system is one of the most byzantine policies in agriculture, and in the context of testaments to pure bureaucratic accomplishments, that is no modest achievement. Perhaps the main reason the system has lasted for 80 years is that advocates for the status quo have successfully challenged critics on the basis that they do not truly understand how the system operates in detail. Proponents have not recognized that to claim that a convoluted regulatory system that defies understanding is to highlight a government failure, not a success. In fact, the FMMO system is complicated mainly because it has tried, nobly in some cases, to mimic market forces. But the program’s history has documented time and again that regulators simply cannot capture the full force of market incentives with regulatory rules.

Marketing orders do not simply gum up the gears of progress for the dairy industry, which is bad enough; they cause higher prices for consumers of beverage milk products (notably children). Marketing orders also transfer revenues among milk producers to favor those least suited to satisfy buyers with lower-cost and innovative products.

Finally, the new dairy subsidy program, the MPP, provides periodic subsidies when the national average margin of milk price is above a USDA-calculated feed price index. Over a decade-long horizon, this program would probably increase milk revenues received by dairy farm businesses by a few percentages. But that is purely a subsidy from taxpayers for no clear public good and with no clear rationale. The program also continues regional and other biases such that US dairy policy is once again transferring income from successful progressive and competitive dairy farms to those likely to be exiting the business.

So the bottom line: It is time to set the cows free. Let the US dairy industry embrace its global competitiveness and innovate unencumbered by old-fashioned and outmoded policy ideas.

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Acknowledgments

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Appendix: Basic Economic Framework of Federal Milk Marketing Orders

Figure A1 is the standard diagram used by economists to illustrate the key elements of milk marketing orders. An important feature of the market depicted in Figure A1 is that demand for raw milk used for fluid products, \( Q_F \), is a function of \( (P_F) \) in that marketing order region. Moreover, that demand relationship is inelastic because beverage milk is heavy and expensive to transport and is therefore limited only to relatively local markets. Milk from outside is less available to compete for beverage uses within the marketing order. The opposite is true for the demand for milk that is used for manufactured products such as butter, milk powder, and cheese. That milk within a marketing order faces relatively elastic demand because the products produced from milk in a particular region compete in national and global markets. For simplicity, in Figure A1, demand for manufacturing milk is shown as perfectly elastic, so that the price of manufacturing milk facing the marketing order, \( P_M \), is independent of allocation of this region’s milk to this use. The marginal cost of producing raw milk is denoted in the figure as \( MC_A \).

With no price regulation and no milk quality differences, a single price, \( P_M \), prevails for milk in all uses in the single regional market. The total quantity of Grade A milk produced is \( Q_{A0} \), the quantity sold to the fluid market is \( Q_{F0} \), and the difference is sold to the manufacturing market.

Marketing order regulations raise the price of milk used for fluid milk products by a fixed markup \( D \) to \( P_{F1} \), and the higher price reduces the quantity sold on the fluid product market to \( Q_{F1} \). The marketing order allows the price for milk used in manufacturing to equal the market determined price \( P_M \). The blend price paid to producers, found along the curved line labeled \( P_{blend} \), falls as the total quantity of milk sold rises. The blend price is the incentive price for milk producers, resulting in total quantity of milk, \( Q_{A1} \), and blend price, \( P_{A1} \). By reducing fluid consumption and increasing total milk production, the marketing order increases the quantity of milk sold to the manufacturing market, some of which is exported.

Under this depiction, the economic loss to consumers in the market for fluid milk products is equal to area \( a + b + c + d \), and the gain to producers is equal to area \( b + d + e \). Area \( c \) is loss to consumers not transferred to producers. Revenue pooling also induces excess milk production, the cost of which is measured by area \( f \).

This complicated, but conceptually simple, model shows how the FMMO causes the quantity of milk used for manufactured products to be higher. The high government-set price for beverage milk products discourages consumption of those products, so milk that would otherwise be used for locally consumed products shifts to processed products. Second, the higher average price of raw milk stimulates milk production. Milk that is used for the manufactured products receives a price above the price paid by manufacturers of those products. For milk used in manufactured products, the supplying farm receives a higher price than the buyer pays, with the difference contributed by beverage milk processors and milk drinkers.

Without a government marketing order, the price for milk to dairy farms would be the same, independent of the final use of the milk (abstracting from milk component characteristics or transport costs, etc.).

As noted, the price of milk to the farms in the government system, however, is neither the Class I price of milk used for fluid beverage products nor \( P_M \) but...
is a weighted average of the two, with the weights based on the quantity shares in each use. That is, the price and quantity of milk in the fluid beverage-use market is directly derived from the total quantity and the price and quantity in the market for milk used for manufactured products.

**Figure A1. A Standard Diagram Depicting the Stylized Economics of Milk Marketing Orders**

Note: See text for explanations of notation.
Source: Author.
Notes


10. The extreme case is wine grape, where prices routinely range from $300 per ton to $6,000 per ton and sometimes much more.


DAIRY POLICY PROGRESS


22. See Figure 6 in MacDonald, Cessna, and Mosheim, “Changing Structure, Financial Risks, and Government Policy for the U.S. Dairy Industry.” That figure shows how US commercial exports of skim milk powder were about zero until 2004 when US prices fell below those of Oceania (Australia and New Zealand). Exports have become substantial in the past decade as US prices have remained competitive.

23. See Greene, “Federal Milk Marketing Orders.”


26. In the California MMO, all plants must be in the pool and pay the government-set minimum prices.

27. Greene, “Federal Milk Marketing Orders.”

28. An interesting feature of FMMO voting is that milk cooperatives are allowed to “block vote” for their members. In the California case, about 80 percent of the farms with about that share of the milk in the state are members of three large cooperatives. If these three cooperatives vote yes, then the California FMMO would be approved. This could occur even if the measure was favored by a bare majority of each cooperative and favored by few farms that were not members of cooperatives. In this case a majority of all farms may disapprove of the FMMO. But a potential case is more extreme. Two of the cooperatives are national with most of their members and milk purchases outside California. To benefit their national membership, those cooperative could block-vote in favor of the California FMMO, even if a majority of their California members opposed the California FMMO.

29. See page 12 in Greene, “Federal Milk Marketing Orders.”

30. For an analysis of milk marketing order pricing as a reflection of political power, see, for example, Byeong-il Ahn and Daniel A. Sumner, “Political Market Power Reflected in Milk Pricing Regulations,” American Journal of Agricultural Economics 91, no. 3 (2009): 723–37.


32. The MPP is often compared to the Livestock Gross Margin for Dairy (LGM-Dairy), an insurance program offered through the USDA Risk Management Agency. The LGM-Dairy program has been available since 2008, well before the MPP was created. It offers insurance for the milk price minus feed costs margins using futures market prices for milk, corn, and soybean meal to compute the margins. Despite significant premium subsidies of up to 50 percent, and flexibility in choosing specific insurance product timing and other features, enrollment in LGM-Dairy has been low.

33. When MPP was first suggested, it was to me accompanied by a supply management program that would hold down milk output when margins were unusually low. For discussion of the issues when supply management was expected to combined with an MPP-style program, see Joseph V. Balagtas and Daniel A. Sumner, “Evaluation of U.S. Policies and the Supply Management Proposals for Managing Milk Margin Variability,” American Journal of Agricultural Economics 94, no. 2 (2012): 522–27. In the 2014 Farm Bill a demand stimulus, the Dairy Product Donation Program, is scheduled to kick in when margins are below $4.00 per hundredweight. So far the program has not been triggered, and such low margins have been quite rare. The program itself is unlikely to make much impact and is not discussed further here.
34. Schnepf, “Dairy Provisions in the 2014 Farm Bill (P.L. 113-79).”
40. See, for example, US Department of Agriculture, “Margin Protection Program for Dairy Producers (MPP-Dairy).”
41. Analysis of potential supply response has emphasized the risk reduction asked of the program. See Mark et al., “The Effects of the Margin Protection Program for Dairy Producers.” They usefully simulate impacts of the MPP by state from 2002 to 2013 by production base for alternative share of production covered and for alternative margins covered.