

## **Contemporary Issues in Economics of Dairy Markets and Policy**

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Milk production occurs in every state and the highly perishable nature of the product means that every state also has some processing capacity. It is ubiquitous. Dairy farming and all of the downstream activity and economics also is sufficiently different from other forms of agriculture that dairy has evolved its own set of institutions and policies. Perhaps it is not surprising then that the issues and problems of the dairy sector over the years present their own story and have their own academic literature.

Inelastic demand and low short-term price responsiveness of milk supply make dairy markets very volatile. Macroeconomic shocks, biofuels policy and increased exposure to international trade, have combined to make dairy profit margin shocks particularly detrimental in the last decade. The policy response came in the form of the Agricultural Act of 2014 which introduced the Margin Protection Program for Dairy Producers and enabled California to join the Federal Milk Marketing Order system while keeping the state dairy quota system. These developments provoked intense research interest among U.S. agricultural economists in recent years, and this special issue of the *Journal of Agribusiness* brings together five articles on these topics. Before overviewing the contributed articles, this introduction takes a step back and situates the most recent policy innovations in a much broader historical context. Our hope is that by understanding the long-term trends in dairy markets and policy, we can better appreciate the present situation, and provide guidance for suggested research topics that should be addressed in the following years.

### **Dairy Market Economic Themes**

The study of the economics of dairy markets and, later, dairy policy presents a rather wide field of topics united by a common reference to markets for farm milk and dairy products. Historically, topics have included pricing, consumption, industrial organization, economic regulation, processing economics, supply chain coordination, marketing logistics, international trade, and so on. Although narrow in the sense of the industry or

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commodity, the study of dairy markets and policy actually offers a rich diversity of approaches and topics that can draw from every field of economics and business. Certain themes have dominated eras in the evolution of dairy markets and the associated institutions.

Studies related to the marketing of milk, dairy processing, and milk pricing began to appear regularly around 1900. One of the earliest studies was published in 1842 and related to milk quality in the New York City market. Although not an economics study per se, this book includes important sections on market structure, marketing methods and pricing (Hartley, 1842). By the early 1900s, studies of milk markets were becoming more common. The increasing availability of data led to studies that characterized milk markets (Alvord and Pearson, 1903; Hibbard and Erdman, 1917) or discussed payment systems and the role or nature of prices (Van Slyke, 1908) or aspects of supply chain logistics and coordination (Ward, 1903). A number of studies focused on institutions and practices that existed in various "city markets" or other geographic locales (Whitaker, 1898).

A topic of particular interest at this time was pricing systems. Three aspects were of particular interest. First, how can prices be used to reward physical attributes that differentiate value: composition (e.g., fat content) and quality (e.g., bacteria content or lack of adulteration). Second, how can prices reflect economic costs, in particular spatial costs and valuation driven by transportation or temporal prices driven by storage? Pricing efficiency and coordination mechanisms were primarily driven by buyers of milk, who sought to create incentives for producers. The third general area of pricing interest related to the competitive nature of markets and the ability of dairy farmers to negotiate milk prices that they believed to be fair and reasonable. This led to a rich literature on cooperative milk marketing (Bartlett, 1931; Clyde, 1920; Cassels, 1937). Another approach was to create pricing systems, usually propagated by cooperatives, which were intended to result in "better" prices for dairy farmers. Early examples included classified pricing and pooling and plans that had overt intention of disincentivizing expansion, sometimes called Base Rating Plans or Base-Surplus Plans. Of course, the development of Federal and State pricing regulations, beginning in the 1930s, led to a new subset of dairy literature related to dairy policy.

The Agricultural Adjustment Act of 1933 offered an uncertain beginning to federal dairy programs, but it laid the groundwork for two key pieces of legislation that occupied the attention of the dairy industry and economists for the remainder of the 20<sup>th</sup> Century.

The Agricultural Marketing Agreement Act solidified the legal framework for a national system of farm pricing regulations that applied to geographic markets around the United States. The Federal Milk Marketing Order system was based on the concepts of classified pricing and pooling that were developed and propagated by cooperatives beginning in the late 1890s. This system of price discrimination based on the products



into which milk is made and then the sharing of the average market-wide revenue across all farmer suppliers remains the foundation of milk pricing today, with pricing authority primarily under federal law but also under the laws of certain states, most notably California, which represents over 1/5 of the U.S. milk supply.

Although the price discrimination built into classified pricing schemes was designed to increase total revenue to dairy farmers, the limited ability of this system to accomplish significant and perceptible price increases, partly due to its slow adoption across the U.S., led the industry to seek permanent status for price supports that were used a bit in the Depression and more so during World War II. The fall of agricultural markets after an initial post-War boom led to the Agricultural Act of 1949 and the permanent establishment of a Milk Price Support Program based on purchases of certain dairy commodities when milk prices were low relative to a trigger based on the old concept of parity. Following a brief boom in production and the resulting excess supply caused by an over eager use of the new Milk Price Support Program, Congress introduced Dairy Import Quotas in 1951. This completed the troika of dairy programs that ruled over most of the 20<sup>th</sup> Century.

The dairy policy literature between World War II and 1980 was largely focused on technical questions and issues that related to how to improve the extant systems. Two key events of the 1970s created an inflection point in dairy policy. One was the significant price inflation that was primarily triggered by rising petroleum costs as the new OPEC became functional. Inflation in the United States was also exacerbated by inflationary fiscal and monetary policies at the time of the Vietnam War and various New Frontier and Great Society programs. The second was the slow but sure move towards freer trade in agricultural and food products that began with the Kennedy Round (1960s) and Tokyo Round (1970s) of the GATT.

The first challenge led to the eventual collapse of the Milk Price Support Program, although that process took the better part of two decades. The Russian Wheat Deal of 1972 refers to a clever series of almost clandestine purchases by the Soviet Union that essentially cornered markets for wheat and corn. With an initial push from the Soviet Union and then the sustained push of OPEC, corn prices jumped from a regime of \$1 to \$1.50 a bushel in the 1950s and 60s to the primarily \$2-\$3 regime from 1973 until the ethanol era beginning in 2007. The near doubling of corn prices in the span of only two years created margin stress on dairy farmers that would not be seen again until the next major corn price regime change some 35 years later. It came at a time when inflation was the primary concern of federal economic policymakers. Although the Secretary of Agriculture had the tools to quickly move dairy commodity and farm milk prices upward, the Nixon Administration was loathe to do so. The failure of the Nixon and Ford Administrations to come to the rescue of dairy farmers opened the door for a new

President Carter and, later, a sympathetic Democrat controlled Congress to aggressively move the Milk Price Support target upwards. Although it took a couple of years, markets eventually responded and by the early 1980s it was clear that we had created an unprecedented surplus of milk and dairy commodities. Even the Reagan Administration, with a divided Congress, found it distasteful to simply let prices fall to find a new equilibrium. Thus, a series of almost annual dairy policy changes led to a spasm of new programs to eliminate the surplus, hopefully without allowing prices to fall precipitously. Some of these programs came and went and were declared short-term successes but long-term failures, such as the Milk Diversion Program. Others proved to not be especially helpful in the short run but have been deemed long term successes, such as the ongoing National Dairy Promotion and Research Board and attendant "check-off". Thus, the late 1970s and 1980s resulted in a spate of research that followed the dairy price support policy that was dominating attention in that era. A few more mundane issues intruded, such as a form of hedonic pricing related to milk composition, a nascent Uruguay Round that promised to bring the world dairy sector more deeply into the next GATT, and newly emerging interest in mechanisms of price discovery in dairy markets that had become mostly regulated and spot markets for dairy commodities that caused nervousness because of their exceedingly low volumes yet large influence on contract prices.

The Milk Price Support Program effectively crashed in 1989, i.e., the support price target, through bits of reductions here and there, finally fell below a market clearing level. After that attention shifted to Federal Milk Marketing Orders. Throughout the 1980s, parts of the U.S. dairy farm sector, primarily defined by region, took turns characterizing the villains who were mostly responsible for the excess supply debacle that overwhelmed dairy markets in that decade. Whether or not the Upper Midwest truly emerged from that decade more victimized than any other region is debatable, but it is inarguable that dairy farmers and their leaders in that region felt so. Being surpassed in milk production by California in 1993 probably put proof to their argument. In any case, Congressman Steve Gunderson of Wisconsin used his position of seniority on the House Agriculture Committee and the opportunity of the 1996 Farm Bill to press a series of strong challenges to the Federal Milk Marketing Order system that made it the center of attention during the 1990s. Following a series of feints and counter moves that involved revolutionary legislative proposals and system-wide regulatory hearings to stave off legislative changes, the 1996 FAIR Act required the U.S. Department of Agriculture (USDA) to develop a sweeping set of changes to the Federal Milk Marketing Order System that would increase the uniformity of provisions across geographic areas and reduce the number of regulated areas to one-third by a process of mergers. The so-called Federal Order Reform culminated in a new set of 11 regional marketing areas (now 10), a uniform system of four milk utilization classes, a uniform pricing system that bases the values of farm milk on derived wholesale values of four dairy commodities, and a

valuation system that emphasized protein as well as the more historically familiar milkfat. A good deal of academic attention was focused on aspects of Federal Order reform, including an important but largely ignored voice that called for the elimination of federal price regulation.

Interest in price risk management was first stimulated by increased volatility in milk prices following the essential collapse of the Milk Price Support Program in 1989. It gained further impetus when volatility increased following the implementation of the Uruguay Round Agreement on Agriculture in 1996. The first futures contracts related to dairy pertained to nonfat dry milk and cheddar cheese and were launched on the Coffee, Sugar, and Cocoa Exchange in New York City. In 1996, dairy futures were initiated on the Chicago Mercantile Exchange, which quickly displaced the New York exchange as the focal point for dairy trading activity. Contracts were developed of cheese, butter, nonfat dry milk, dry whey, Class III milk and Class IV. Adoption of futures market tools has been slow, especially among farmers. In 2008, the Risk Management Agency of USDA began offering a new risk management tool that afforded dairy farmers the opportunity to insure income over feed cost risk, with the price of milk defining income and prices for corn and soybeans defining feed costs. In the Agricultural Act of 2014, a new Margin Protection Program (MPP) for Dairy Producers was created to provide a kind of countercyclical benefit derived from a national income over feed cost measure. The new MPP-Dairy swept away the previous countercyclical payment program known as the Milk Income Loss Contract or MILC. In some fashion or another, a CCP program had been in place for dairy farmers since 2000. Although a variety of risk management tools have been and are available, dairy farmers have been slow to embrace risk management strategies. Thus, the issues of output and input price volatility and the alternatives for managing farm financial risk has been of particular interest among academic researchers in recent years.

## **This Issue**

An article by Wolf, Novakovic, Stephenson and Knoblauch opens this journal issue by discussing the correlation between national income over feed cost margin benchmark that underpins the MPP-Dairy, and actual indicators of dairy farm financial stress. Their results suggest MPP-Dairy will be effective in offering risk management protection to dairy producers in Midwest and Northeast regions. Further work is needed to examine how MPP-Dairy would perform for producers in the western United States.

How much will MPP-Dairy cost and what will be farm-level effects on milk supply and market-level impacts for milk price dynamics? These topics are addressed by several articles in this issue. Mark, Burdine and Halich examine the total policy costs and find



that expected outlays to be close to CBO estimates, but emphasize their results are sensitive to milk price and feed costs departures from the baseline scenario.

The third article by Raghunathan uses dynamic programming framework to examine the impact of MPP-Dairy on milk supply responsiveness on small, medium and large farms. Both MPP-Dairy and MILC are found to have distortionary effects on milk supply. Whether MPP-Dairy alters behavior more or less than earlier policies depends on the extent to which large farms utilize the new program.

Nicholson and Stephenson use the system dynamics approach to jointly examine the theme of overall policy cost and changes in milk supply behavior induced by the MPP-Dairy. They claim that the design of MPP-Dairy has the potential to substantially weaken processes that would adjust milk production, prices and margins if margins fall below program threshold levels, especially if the proportion of milk covered by insurance is large.

An article by Sumner and Yu on the impact of MPP-Dairy and potential new California Federal Milk Marketing Order on the value of California milk pool quotas closes this journal edition. Both policy innovations are found to have mixed effects on milk pool quota. By reducing policy risk, quota values are increased. On the other hand, to the extent these policy changes increase farm profitability, they will tend to reduce the value of quota.

## **Further Research**

While articles contained in this issue cover important topics in contemporary dairy policy analysis, there is a wide field for additional research. The sweeping dairy program changes in the Agricultural Act of 2014 have yet to prove successful as a redirection of dairy farm support policy. Farmers have yet to embrace the practices of risk management that are held as common in other sectors. Have we assessed the nature of dairy farm risks properly? Are currently available tools adequate, much less optimal? Have we misunderstood the ability of the milk production sector to tolerate risk? Will MPP-Dairy provoke oversupply that will have to be addressed by the next Farm bill? How much do MPP-Dairy premium levels (and associated implied subsidies) matter for adoption rates and coverage levels chosen? Finally, can MPP-Dairy-type programs be successfully implemented as a policy instrument in the European Union?

Going beyond the issues of immediate concern, further research in dairy markets and policy should also address emerging issues in Federal Milk Marketing Order regulation and dairy trade. Regulation of minimum milk prices paid by processors remains a cover page on a sweeping narrative involving methods of price discovery, constraints on product and market innovation, interregional competition, the nature of farm level market competition, and the ability of cooperatives or other private sector management tools to

operate in an unregulated market. The recent Supreme Court ruling that the volume regulation activities of the Federal Raisin Marketing Order (#989) constitutes an illegal "taking" strikes a hard blow at the underlying philosophy of marketing orders that restraints on trade of an individual firm can be sacrificed for a greater industry good, provided certain strict forms of establishment are followed. As the dairy sector becomes increasingly dominated by very large scale farms, it is not hard to imagine similar challenges to the very nature of this 80 year old system.

International trade presents a new frontier for dairy processors and their milk supplier partners. The sector's attitude has evolved from one of fear of imports to cautious skepticism about freer trade to delight at new export opportunities. However, we are beginning to learn that freer trade can create its own uncertainties and market anxieties, and it is too early to assess the extent to which we are a strong competitor or a convenient surge tank for changes in world supply and demand.

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