



Agricultural Marketing Service
U.S. DEPARTMENT OF AGRICULTURE

**U.S. Department of Agriculture
Report to Congress**

on the

**Dairy Promotion and
Research Program**

and the

**Fluid Milk
Processor Promotion Program**

2020 Activities

September 2023

Contact Information

Promotion, Research, and Planning Division
USDA, Agricultural Marketing Service, Dairy Program
Stop, 0233, Room 2542-South
1400 Independence Avenue, SW
Washington, DC 20250-0233
<http://www.ams.usda.gov/dairy>

Oral Capps, Jr., PhD
Executive Professor, Regents Professor and Co-Director of Agribusiness, Food and Consumer Economics Research Center
Texas A&M University
Department of Agricultural Economics
2124 TAMU
College Station, TX 77843
(979) 845-5911
Email: AFCERC@tamu.edu
<http://AFCERC.tamu.edu>

National Dairy Promotion and Research Board
Dairy Management Inc.
10255 West Higgins Road, Suite 900
Rosemont, IL 60018
(847) 803-2000
<http://www.usdairy.com>

National Fluid Milk Processor Promotion Board
1250 H Street NW, Suite 950
Washington, DC 20005
(202) 737-0153
<http://www.milklife.com>

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering the USDA programs are prohibited from discriminating based on race, color, national origin, region, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/paternal status, income derived from public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (i.e., Braille, large print, audiotope, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at http://www.ascr.usda.gov/complaint_filing_cust.html and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: program.intake@usda.gov.

USDA is an equal opportunity provider, employer, and lender.

Mention of a trade name or brand name does not constitute endorsement or recommendation by USDA over other similar products not named.

Contents

Contact Information	2
Executive Summary.....	5
Chapter 1: The Dairy and Fluid Milk Processor Promotion Programs	7
Chapter 2: USDA Activities.....	10
Chapter 3: Quantitative Evaluation of the Effectiveness of Promotion Activities by the National Dairy Promotion and Research Program and the National Fluid Milk Processor Promotion Program	13
Chapter 4: Qualified State, Regional, or Importer Dairy Product Promotion, Research, or Nutrition Education Programs.....	37
Additional Information: Approved Contracts, National Dairy Foods Research Centers, and Research Activities.....	41

Executive Summary

The enabling legislation of the dairy producer, dairy importer, and fluid milk processor promotion programs requires the U.S. Department of Agriculture (USDA) to submit an annual report to the House Committee on Agriculture and the Senate Committee on Agriculture, Nutrition, and Forestry. The dairy and fluid milk promotion programs are conducted under the Dairy Production Stabilization Act of 1983 (7 U.S.C. 4501 *et seq.*) (Dairy Act); the Dairy Promotion and Research Order (7 CFR § 1150) (Dairy Order); the Fluid Milk Promotion Act of 1990 (7 U.S.C. 6401 *et seq.*) (Fluid Milk Act); and the Fluid Milk Promotion Order (7 CFR § 1160) (Fluid Milk Order), respectively. This report includes summaries of the activities for the dairy and fluid milk programs, including an accounting of funds collected and spent, USDA activities, and an independent analysis of the effectiveness of the programs. Unless otherwise noted, this report addresses program activities for January 1 through December 31, 2020, of the Dairy Promotion and Research Program and the Fluid Milk Processor Promotion Program.

Dairy Promotion and Research Program

Mandatory assessments collected under the Dairy Act totaled \$346.8 million in 2020. The Dairy Board portion of assessments totaled \$120.5 million, and the Qualified Dairy Product Promotion, Research, or Nutrition Education Programs (QPs) totaled \$223.6 million. Expenditures by the Dairy Board and many of the QPs are integrated through a joint process of planning and program implementation to work together on the national, regional, State, and local level. The Dairy Board continued to develop and implement programs to expand the consumption of dairy products by focusing on partnerships and innovation, product positioning with consumers, and innovations for dairy product consumption.

Details of the Dairy Board's activities are presented in Chapter 1. Details of the QPs' activities may be found in Chapter 4.

Fluid Milk Processor Promotion Program

Mandatory assessments collected under the Fluid Milk Act totaled \$85.7 million in 2020. The Fluid Milk Processor Promotion Board (Fluid Milk Board) continued to administer a generic fluid milk promotion and consumer education program funded by America's fluid milk processors. The program is designed to educate Americans about the benefits of fluid milk, increase milk consumption, and maintain and expand markets and uses for fluid milk products in the contiguous 48 States and the District of Columbia.

The Fluid Milk Order requires the Fluid Milk Board to return 80 percent of the funds received from California fluid milk processors to the California Milk Processor Board. Per the Fluid Milk Order requirement, \$7.2 million was returned to the California Milk Processor Board. The activities of the Fluid Milk Processor Promotion Program are presented in the Fluid Milk Board section in Chapter 1.

USDA Activities

USDA has oversight responsibility for the dairy and fluid milk promotion programs. The oversight objectives ensure the boards and QPs properly account for all program funds and administer the programs in accordance with the respective acts and orders and USDA guidelines and policies. USDA reviewed and approved all board budgets, contracts, and advertising materials. USDA employees attended all board and committee meetings, monitored all board activities, and were responsible for obtaining an independent evaluation of the programs. Additional USDA responsibilities include nominating and appointing board members, amending the orders, conducting referenda, assisting with noncompliance cases, and conducting periodic program management reviews. The boards reimbursed the U.S. Secretary of Agriculture (Secretary), as required by the acts, for all of USDA's costs of program oversight and for the independent analysis discussed in Chapter 3. Chapter 2 details USDA's oversight activities.

Independent Analysis

Chapter 3 describes the results of the independent econometric analysis, conducted by Texas A&M University, on the effectiveness of the programs implemented by the Dairy Board and the Fluid Milk Board. The analysis indicates that the generic fluid milk marketing activities sponsored by the programs have mitigated the decline of fluid milk consumption.

In addition, Chapter 3 presents the combined effects of 2020 promotion activities on the consumption of fluid milk, cheese, butter, all dairy products, and dairy exports and includes the benefit-cost ratios (BCRs) for dairy producers, importers, and fluid milk processors. For every dollar invested in demand-enhancing activities, the BCRs for producers were as follows: (1) fluid milk - \$1.91; (2) cheese - \$3.27; (3) butter - \$24.11. The BCR for fluid milk processors attributed to fluid milk promotion activities is \$2.84.

Chapter 1

The Dairy and Fluid Milk Promotion Programs

The Dairy Board and the Fluid Milk Board continued to develop and implement programs to expand the human consumption of fluid milk and dairy products. This chapter details the activities of each board.

1. National Dairy Promotion and Research Board

The mission of the Dairy Board is to coordinate a promotion and research program that maintains and expands domestic and foreign markets for fluid milk and dairy products. The Dairy Board is responsible for administering the Dairy Order, developing plans and programs, approving budgets, and monitoring the program results.

The Secretary appoints 37 members to the Dairy Board, 36 of whom are dairy producers, each representing 1 of 12 geographic regions within the United States, and 1 representing dairy importers. The appointments are made from nominations submitted by individual applicants, producer organizations, importer organizations, general farm organizations, and QPs. Dairy Board members must be active dairy producers or dairy importers. Members serve staggered 3-year terms, with no member serving more than two consecutive terms.

Total Dairy Board income and expenses are provided in the annual independent audit report. The 2020 audit report can be found at: [https://www.usdairy.com/getmedia/745960ff-f870-4ed5-a105-a17963b6efb7/National-Dairy-Board_2020-19_FINAL-\(Secured\).pdf?ext=.pdf](https://www.usdairy.com/getmedia/745960ff-f870-4ed5-a105-a17963b6efb7/National-Dairy-Board_2020-19_FINAL-(Secured).pdf?ext=.pdf). The Dairy Board's administrative budget continued to be within the 5-percent-of-revenue limitation required by the Dairy Order.

The Dairy Board has two standing committees: the Finance Committee and the Executive Committee. The Finance Committee consists of the Dairy Board officers and appointees named by the Dairy Board Chair. The Dairy Board Treasurer chairs the Finance Committee. The full Dairy Board serves as the Executive Committee. The other Dairy Board committees are joint program committees with the United Dairy Industry Association (UDIA).

Dairy Management Inc. (DMI), the management and staffing corporation, is a joint undertaking between the Dairy Board and UDIA. UDIA is a federation of 16 of the 62 QPs under the direction of a board of directors. The mission of DMI is to drive increased sales of and demand for dairy products and ingredients on behalf of dairy producers and dairy importers. DMI works proactively, in partnership with leaders and innovators, to increase and leverage opportunities to expand dairy markets. The DMI Board of Directors comprises all Dairy Board (37) and all UDIA (41) members. Voting is equalized between the Dairy Board and UDIA.

DMI serves the Dairy Board and the UDIA Board and facilitates the integration of promotion funds through a joint process of planning and program implementation so that the programs on the national, regional, State, and local level work together. The Dairy Board and UDIA Board must separately approve the DMI budget and annual plan before these plans can be implemented.

During 2020, DMI continued to implement a national staffing structure to plan and execute the national programs.

DMI funds 1- to 3-year research projects supporting marketing efforts. Six Dairy Foods Research Centers and one Nutrition Institute provided much of the research in 2020. Universities and other industry researchers throughout the United States compete for these research contracts. A description of the research objectives and locations can be found in the Additional Information section of this report.

The joint Dairy Board and UDIA Board committee structure provides the framework for DMI program activities. The Dairy Board and UDIA Board Chairs assign their respective board members to the following five joint program committees: Position U.S. Dairy in a Global Food System; Accelerate Incremental Sales Growth; Build Trust in Youth and the Conflicted Health Seeker; Farmer and Community Relations; and Exports. Each committee elects a chair and vice-chair. The DMI Board and joint committees set program priorities, plan activities and projects, and evaluate results. During 2020, the Dairy Board and UDIA Board met jointly six times both in person and virtually due to the pandemic.

For more information on the Dairy Board and UDIA Board activities and initiatives implemented in 2020, see the DMI annual report at <https://www.usdairy.com/getattachment/2472fdaf-a14d-4cc9-9577-6372c876cce5/2020-annual-report.pdf?lang=en-US&ext=.pdf>.

II. National Fluid Milk Processor Promotion Board

The Fluid Milk Board, as authorized in the Fluid Milk Act, administers a fluid milk promotion and consumer education program funded by fluid milk processors. The program is designed to educate Americans about the benefits of fluid milk, increase milk consumption, and maintain and expand markets and uses for fluid milk products in the contiguous 48 States and the District of Columbia. The fluid milk marketing programs are research-based and message-focused for the purpose of positively changing the attitudes and purchase behavior of Americans regarding fluid milk.

The Secretary appoints 20 members to the Fluid Milk Board. Fifteen members are fluid milk processors who each represent a separate geographical region, and five are at-large members. Of the five at-large members, at least three must be fluid milk processors and at least one must be from the general public. The members of the Fluid Milk Board serve 3-year terms and are eligible to be appointed to two consecutive terms. The Fluid Milk Order provides that no company shall be represented on the Fluid Milk Board by more than three representatives. Fluid Milk Board members who fill vacancies with a term of 18 months or less may serve two additional 3-year terms. The Milk Processor Education Program (MilkPEP) carries out the activities of the Fluid Milk Board.

The Fluid Milk Board elects four officers: Chair, Vice-Chair, Secretary, and Treasurer. Fluid Milk Board members are assigned by the Chair to the Fluid Milk Board's program committees. The program committees are responsible for setting program priorities, planning activities and projects, and evaluating results. In addition, the Fluid Milk Board has a Finance Committee to

review all program authorization requests for funding sufficiency as well as review the Fluid Milk Board's independent financial audit and the work of the board's accounting firm. The Fluid Milk Board met three times in 2020 to conduct board business.

Total Fluid Milk Board income and expenses are displayed in the annual independent financial audit. The Fluid Milk Board's 2020 audit report can be found at <https://s3-us-west-2.amazonaws.com/externalassets-p.milkpep-production.g43labs.net/2020%20Annual%20Report/2020%20Financial%20Statements%20and%20Independent%20Auditor's%20Report.pdf>. The Fluid Milk Board's administrative budget continued to be within the 5-percent-of-revenue limitation required by the Fluid Milk Order. For more information on the Fluid Milk Board activities and initiatives implemented in 2020, see the MilkPEP annual report at <https://s3-us-west-2.amazonaws.com/externalassets-p.milkpep-production.g43labs.net/2020%20Annual%20Report/MilkPEP%202020%20Annual%20Report%20-%20Final.pdf>.

Chapter 2

USDA Activities

The USDA's Agricultural Marketing Service's (AMS) Dairy Program has oversight responsibilities for the Dairy Board and the Fluid Milk Board. AMS Dairy Program's oversight activities include reviewing and approving the Dairy and Fluid Milk Boards' budgets, contracts, investments, and marketing campaigns. Materials are monitored for conformance with provisions of the respective Acts and Orders and the U.S. Dietary Guidelines for Americans in addition to other legislation. AMS Dairy Program also uses the "*Guidelines for AMS Oversight of Commodity Research and Promotion Programs*" to govern oversight and facilitate the application of legislative and regulatory provisions of the Acts and the Orders.

The AMS Dairy Program ensures that the collection, accounting, auditing, and expenditures of promotion funds are consistent with the enabling legislation and Orders; certifies Qualified Programs; and provides for the evaluation of the effectiveness of both promotion programs' advertising campaigns. The AMS Dairy Program assists the boards in their assessment collection, compliance, and enforcement actions.

Other AMS Dairy Program responsibilities include facilitating the nomination and appointment process of board members, amending the Orders, conducting referenda, reviewing communications, and conducting periodic management reviews. AMS Dairy Program representatives attend full board and committee meetings and other meetings related to the programs.

Dairy Promotion and Research Program Oversight

Collections

The Dairy Act specifies that each person making payments to a producer for milk produced in the United States and purchased from the producer should, in the manner prescribed by the Order, collect an assessment based on the number of hundredweights of milk for commercial use handled for the account of the producer and remit the assessment to the Dairy Board. The current rate of assessment for dairy producers is 15 cents per hundredweight of milk for commercial use or the equivalent thereof, as determined by the Secretary. In addition, the rate of assessment for imported dairy products prescribed by the Order is 7.5 cents per hundredweight of milk for commercial use or the equivalent thereof, as determined by the Secretary.

Contracts

The Dairy Act and Dairy Order require contracts that expend assessment funds be approved by the Secretary. During 2020, the AMS Dairy Program reviewed and approved 508 Dairy Board and DMI agreements, amendments, and annual plans. During 2020, DMI retained the certified public accounting firm of Ernst & Young to audit the records of the following contractors: National Milk Producers Federation; McDonald's USA, LLC; Padilla Speer Beardsley Inc.; Cornell University; and Sopexa USA. No material exceptions were found.

USDA Foreign Agricultural Service

The Secretary of Agriculture has delegated oversight responsibility for all foreign market development activities outside the United States to the USDA Foreign Agricultural Service (FAS) (7 CFR 2.43(a)(24)). FAS reviews the US Dairy Export Council (USDEC) foreign market development plan and related contracts. The AMS Dairy Program also reviews USDEC contracts to ensure conformance with the Dairy Act and Dairy Order and established USDA policies. In 2020, the AMS Dairy Program reviewed and approved 113 USDEC agreements, amendments, and annual plans.

Organic Exemption

On December 31, 2015, a final rule was published, with an effective date of February 29, 2016, to amend the organic exemption regulations to allow persons that produce, handle, market, process, manufacture, feed, or import “organic” and “100 percent organic” products to be exempt from paying assessments associated with commodity promotion programs administered by AMS, regardless of whether the person requesting the exemption also produces nonorganic products (80 FR 82005, published December 31, 2015). In States having mandatory assessment laws, organic dairy producers are exempt only from the Federal assessment. Organic producers are still responsible for remittance of State assessments. In 2020, exempted assessments totaled \$3,160,019. The Dairy Order requires organic producers to re-apply annually to continue to receive the exemption.

USDA Dairy Promotion and Research Program Expenses

Per the Dairy Board’s enabling legislation, the Dairy Board reimburses the AMS Dairy Program for the cost of administrative oversight and compliance audit activities. In 2020, the AMS Dairy Program’s oversight expenses totaled \$722,855, and the Federal Milk Market Administrators incurred \$173,681 in expenses for verification audits conducted on behalf of the Dairy Board.

Qualified Programs

Qualified Programs are State, regional, or importer organizations conducting dairy product promotion, research, or nutrition education programs, authorized by Federal or State law, or were active programs prior to the Dairy Act. In 2020, the AMS Dairy Program reviewed applications for continued qualification from 62 Qualified Programs. A list of Qualified Programs is provided in Chapter 4. Consistent with its responsibility for monitoring the Qualified Programs, the AMS Dairy Program obtained and reviewed income and expenditure data from each Qualified Program, and data reported are included in aggregate for 2020 in Chapter 4.

National Fluid Milk Processor Promotion Board Oversight

Program Development

The Fluid Milk Board contracted with Arc USA Chicago; Gale Partners, LLC; and the Interpublic Group Agencies of Campbell-Ewald and CMGRP, Inc., d/b/a Weber Shandwick, to

develop programs for advertising, promotion, and consumer education in connection with the national fluid milk campaign.

Collections

The Fluid Milk Act specifies that each fluid milk processor shall pay an assessment on each unit of fluid milk product processed and marketed commercially in consumer-type packages. The current rate of assessment is 20 cents per hundredweight of fluid milk products marketed.

Contracts

The Fluid Milk Act and Fluid Milk Order require budgets and contracts expending assessments be approved by the Secretary. During 2020, the AMS Dairy Program approved 155 Fluid Milk Board agreements, amendments, and annual plans. The Fluid Milk Board retained the certified public accounting firm of Snyder, Cohn, Collyer, Hamilton & Associates, P.C. (Snyder Cohn) in 2020 to audit the records of: Campbell Ewald; Arc USA Chicago; and CMGRP, Inc., d/b/a Weber Shandwick. No material exceptions were found.

Organic Exemption

On December 31, 2015, a final rule was published, with an effective date of February 29, 2016, amending the organic exemption regulations to allow persons that produce, handle, market, process, manufacture, feed, or import “organic” and “100 percent organic” products to be exempt from paying assessments associated with commodity promotion programs administered by AMS, regardless of whether the person requesting the exemption also produces nonorganic products (80 FR 82005, published December 31, 2015). In 2020, the amount of exempted fluid milk assessments was approximately \$2,732,817. The Fluid Order requires organic fluid milk processors to re-apply annually to continue to receive the exemption.

USDA Fluid Milk Processor Promotion Program Expenses

Per the Fluid Milk Act, the Fluid Milk Board reimburses the AMS Dairy Program for the cost of administrative oversight and compliance audit activities. In 2020, the AMS Dairy Program’s oversight expenses totaled \$459,731, and the Federal Milk Market Administrators incurred \$90,926 in expenses for verification audits conducted on behalf of the Fluid Milk Board.

Chapter 3

Quantitative Evaluation of the Effectiveness of Promotion Activities by the National Dairy Promotion and Research Program and the National Fluid Milk Processor Promotion Program – 1995 to 2020

Introduction

The Dairy Act and the Fluid Milk Act require an annual independent analysis of the advertising and promotion programs that operate to increase consumer awareness and sales of fluid milk and dairy products. Texas A&M University researchers were awarded a competitive contract to conduct this study. This chapter is a summary of the 2020 quantitative evaluation of the effectiveness of the dairy and fluid milk promotion programs.

Background on the Promotion Program

The Dairy Research and Promotion Program, also known as the Dairy Checkoff Program, is a coordinated national research and promotion program intended to maintain and expand domestic and foreign markets for fluid milk and dairy products. To fund the program, U.S. dairy producers pay a 15-cent-per-hundredweight assessment on milk marketing, and importers pay a 7.5-cent-per-hundredweight assessment, or equivalent thereof, on dairy products imported into the United States. Dairy Management Inc. (DMI), a management and staffing corporation, is a joint undertaking between the National Dairy Promotion and Research Board (Dairy Board) and the United Dairy Industry Association (UDIA). UDIA is a federation of 16 of the 62 Qualified Programs¹ (QPs) under the direction of a board of directors. DMI's mission is to drive increased sales of and demand for dairy products and ingredients on behalf of dairy producers and dairy importers. DMI works proactively in partnership with leaders and innovators to increase and apply knowledge that leverages opportunities to expand dairy markets.

The Fluid Milk Processor Promotion Program, or Milk Processor Education Program (MilkPEP), develops and finances generic advertising programs designed to maintain and expand markets for fluid milk products produced in the United States. Fluid milk processors marketing more than 3 million pounds of fluid milk per month pay a 20-cent-per-hundredweight assessment on fluid milk processed and marketed in consumer-type packages in the contiguous 48 States and the District of Columbia.

The Dairy Research and Promotion Program, funded by dairy producers and dairy importers, and the Fluid Milk Processor Promotion program, funded by fluid milk processors, are hereinafter referred to jointly as the National Programs.

¹ Qualified Dairy Product Promotion, Research or Nutrition Educational Programs (Qualified programs or QPs) are state, regional, local, or importer promotion programs certified annually by the Secretary of Agriculture to receive a portion of the funds generated under the Dairy Research and Promotion Program.

Objectives of the Evaluation Study

The National Programs are evaluated with two key questions in mind: (1) Have the demand-enhancing activities conducted by dairy producers, importers, and fluid milk processors increased the demand for fluid milk and manufactured dairy products? and (2) Did those who have paid for the promotions benefit from them?

Historically, these questions have been answered through econometric studies of the relationships between the consumption of dairy products and promotion program demand-enhancing expenditures. These demand relationships are estimated in a structure that controls for the impacts of key market forces. Economic returns to dairy producers, importers, and fluid milk processors that result from marketing and promotion activities and the associated changes in consumption are calculated using the parameters obtained from the estimated demand models. The summary indicator of economic return on investment is a benefit-cost ratio (BCR).

The level of the BCR often is taken as an indication of the impact of a program. In addition, due to diminishing marginal returns, the ratio between the incremental revenue generated and the level of funding (the BCR) declines as funding increases. Consequently, metrics other than the BCR, such as the level of impact on consumption, prices, and exports, are more revealing and useful indicators of the magnitude of checkoff program impact and effectiveness than the BCR.

The objectives of this report are to:

1. Statistically measure the combined effects of the promotion activities of the National Programs on the consumption of fluid milk, cheese, butter, all dairy products, and dairy exports.
2. Provide a quantitative analysis of dairy product imports and import assessments.
3. Update the benefit-cost analysis associated with the National Programs for dairy producers, fluid milk processors, and importers.

This project covers the period of 1995 to 2020 and captures the joint efforts of DMI, MilkPEP, and QPs. The shares of each promotion entity in the total demand-enhancing expenditures over this period are as follows: (1) DMI – 25.98 percent; (2) MilkPEP – 23.39 percent; and (3) QPs – 50.63 percent.

Summary of the Findings

The overall finding of this evaluation is that dairy promotion under the National Programs has effectively increased U.S demand (domestic and exports) for dairy products. Per capita consumption of fluid milk, cheese, and butter rose by 7.9 percent, 3.9 percent, and 5.3 percent respectively. In addition, per capita consumption of nonfat dry milk was higher by 1.6 percent over this period. Exports of butter were lower by 24.3 percent, but exports of cheese were higher by 5.0 percent. Exports of nonfat dry milk were virtually unchanged (up by 0.1 percent) over the 1995 to 2020 period.

The gains in profit at the farm level were larger than the costs associated with the National Programs combined. The returns from the programmatic activities of producers and to fluid milk processors are summarized with BCRs. The BCRs are based on the demand-enhancing

expenditures only; therefore, they do not account for certain operating expenses such as overhead, technical support, and industry relations.

Over the period from 1995 to 2020, the BCRs expressed in terms of producer profit at the farm level were calculated to be \$1.91 for every dollar invested in demand-enhancing activities for fluid milk; \$3.27 for every dollar invested in demand-enhancing activities for cheese; and \$24.11 for every dollar invested in demand-enhancing activities for butter. For other non-specific promotion activities, the BCR was calculated to be \$6.93 for every dollar invested. Over the same period, the BCR of export promotion was \$7.43 per dollar invested. On a fat and skim solids basis, a significant positive relationship was evident between the demand for all dairy products and the advertising and promotion expenditures associated with the National Programs. The aggregate all-dairy BCR was 4.30, meaning that, on average, producer profit increased by \$4.30 for each dollar invested in demand-enhancing activities. Even though the National Programs enhanced producer profit on average, some producers still may be incurring operating losses. These BCRs or returns on investment (ROIs), except for fluid milk, correspond well with those reported in the previous Report to Congress. Previously, the BCR for fluid milk was calculated to be 3.26 using data from 1995 to 2019.

Importers of dairy products have paid assessments to the Dairy Research and Promotion Program since August 2011. Total import assessment funds varied between \$3.44 million and \$4.76 million per year between 2012 and 2020, averaging \$3.93 million. The import assessment represents about 1 percent of the total demand-enhancing expenditures made by DMI, MilkPEP, and the QPs.

Imported cheese levels were higher by 1.38 million pounds based on promotion funds collected from importers. Unit values of cheese imports amounted to roughly \$3.20 per pound on average over the period between 2012 and 2020. Hence, incremental revenue to importers solely from cheese attributable to the import assessment (on cheese) totaled roughly \$4.42 million. These results are in alignment with those in the previous Report to Congress.

Available expenditure data from DMI and MilkPEP also allow for the calculation of separate BCRs at the farm level for the two groups. The BCR associated with DMI spending was estimated to be 5.43, higher than the 4.30 return on investment for all dairy product promotion investments. The BCR for MilkPEP was estimated to be 1.89, very similar to the 1.91 figure previously reported for all fluid milk promotional spending. In the previous Report to Congress, the BCR associated with DMI spending was calculated to be 5.59, while the BCR associated with MilkPEP spending was calculated to be 3.28.

The BCR of fluid milk at the processor level was estimated to be 2.84 over the period 1995 to 2020. Importantly, this measure captures the gross return on investment for fluid milk market participants beyond the farm level. Any additional costs incurred by these market participants from handling the larger volume of fluid milk that occurs due to MilkPEP promotion are excluded because we simply do not know the magnitude of these additional costs. Further, others in the marketing channel besides fluid milk processors capture a portion of this return too. But we have no knowledge of the portion captured by processors versus other milk market participants beyond the farm gate. Because of these caveats, we exercise caution in providing this estimate of the BCR attributed to the promotion of fluid milk at the processor level. In the previous Report to Congress, this BCR was calculated to be 5.61.

Caution must be exercised in making comparisons from various Reports to Congress across years. The economic phrase/condition, *ceteris paribus*, meaning “all other factors invariant,” does not hold. The underlying endogenous and exogenous variables that come from various government sources have been revised and updated, and now four additional quarters of data are available not only pertaining to these variables but also pertaining to the data associated with the programmatic expenditures of the National Programs.

DMI, MilkPEP, and QP Promotion Program Expenditures

The expenditure data for this analysis were acquired from DMI, QPs, and MilkPEP. The demand-enhancing expenditures from all three entities were aggregated in the quantitative appraisal.

The National Programs use advertising as well as other means to influence consumers. Advertising dollars are directed to media outlets including television, outdoor, print, radio, and the internet. Marketing activities other than advertising are directed at the retail level of the marketing channel or at intermediaries. The non-advertising marketing expenditures include health and nutrition education programs, public relations, food service and manufacturing programs, sales promotion programs, school milk programs, school marketing activities, retail programs, child nutrition and fitness initiatives, and single-serve milk promotion.

Certain promotion expenditures are not directed at the retail level of the marketing channel; these types of expenditures include crisis management, trade service communications, and strategic research activities. Because their intent is to directly increase or support sales of dairy products, these expenditures are classified as demand-enhancing expenditures. Expenditures for overhead, technical support, and industry relations are excluded from this analysis because they are not primarily related to demand-enhancing efforts.

Over the years, DMI changed its marketing strategies to focus more on partnerships within the dairy industry to increase demand for fluid milk, manufactured dairy products, and dairy ingredients. Currently, DMI’s strategies include the following: (1) working with and through specific partners to achieve sustainable, category-level sales impacts; (2) attracting partner co-investment to fund demand-enhancing efforts; and (3) maximizing resources and impacts in increasingly competitive markets. These efforts include co-developing marketing information, research, business models, and best practices that can be used by the industry to increase sales of fluid milk and dairy products.

Annual promotion program expenditures made by DMI, MilkPEP, and QPs over the period 1995 to 2020 are depicted in Table 3-1 and in Figure 3-1. On average, roughly \$371 million in total were spent annually by the respective entities over this period and between nearly \$390 million and \$415 million since 2011. In 2020, promotion program expenditures amounted to slightly less than \$390 million.

The data associated with the demand-enhancing activities initiated by DMI and MilkPEP are both available on a quarterly basis. QP data, however, are available only on an annual basis. To estimate quarterly data for the QPs, the seasonal nature of DMI and MilkPEP expenditure data is assumed to be like the QP expenditure data. Consequently, the seasonal factors associated with DMI and MilkPEP data are obtained and applied to the annual QP data to arrive at quarterly

expenditures. The estimation of these data on a quarterly basis is important in allowing for sufficient observations to conduct the econometric analysis of demand for dairy products.

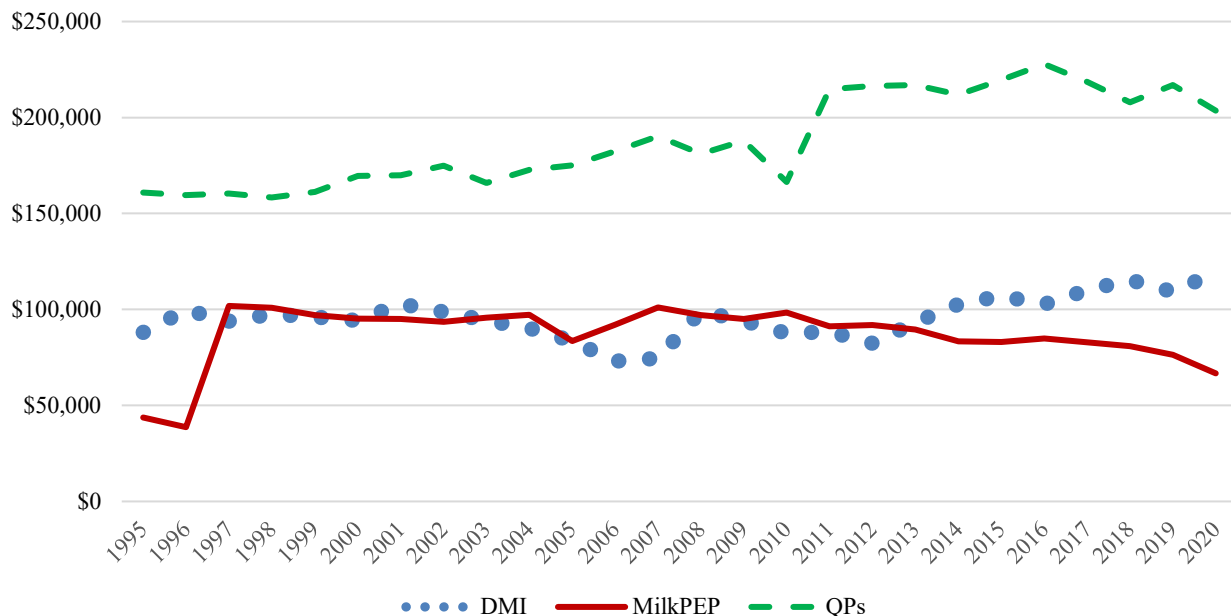
Table 3-1. Annual Dairy Management Inc. (DMI), Milk Processor Education Program (MilkPEP), and Qualified Program (QP) Promotion Program Expenditures, 1995 to 2020¹

Year	DMI	MilkPEP	QPs	Total
1995	\$88,105	\$43,654	\$160,832	\$292,592
1996	\$99,674	\$38,690	\$159,600	\$297,964
1997	\$93,859	\$101,850	\$160,379	\$356,088
1998	\$97,570	\$100,901	\$158,348	\$356,819
1999	\$96,010	\$97,023	\$161,161	\$354,194
2000	\$94,260	\$95,158	\$169,654	\$359,072
2001	\$102,835	\$95,112	\$169,967	\$367,914
2002	\$98,752	\$93,511	\$174,857	\$367,120
2003	\$94,256	\$95,688	\$165,973	\$355,917
2004	\$90,171	\$97,167	\$172,667	\$360,005
2005	\$83,484	\$83,527	\$175,081	\$342,092
2006	\$73,067	\$92,029	\$182,443	\$347,539
2007	\$74,623	\$101,125	\$190,289	\$366,037
2008	\$99,051	\$97,003	\$181,092	\$377,146
2009	\$94,071	\$95,109	\$187,992	\$377,172
2010	\$87,512	\$98,316	\$166,459	\$352,287
2011	\$88,456	\$91,289	\$214,763	\$394,508
2012	\$82,360	\$91,893	\$216,484	\$390,736
2013	\$93,184	\$89,633	\$216,844	\$399,662
2014	\$102,728	\$83,426	\$211,919	\$398,074
2015	\$107,133	\$83,098	\$219,660	\$409,891
2016	\$102,712	\$84,858	\$227,834	\$415,404
2017	\$110,005	\$82,910	\$218,548	\$411,462
2018	\$115,442	\$80,817	\$207,903	\$404,163
2019	\$109,287	\$76,429	\$216,867	\$402,583
2020	\$119,340	\$66,712	\$203,544	\$389,595
Mean	\$96,075	\$86,805	\$188,122	\$371,001
Median	\$95,135	\$91,961	\$181,768	\$367,517
Std Dev	\$11,028	\$15,530	\$23,289	\$30,760
Min	\$73,067	\$38,690	\$158,348	\$292,592
Max	\$119,340	\$101,850	\$227,834	\$415,404

¹Thousands of dollars.

Source: Data from Dairy Management Inc., Milk Processor Education Program, and U.S. Department of Agriculture.

Figure 3-1. Annual Dairy Management Inc. (DMI), Milk Processor Education Program (MilkPEP), and Qualified Program (QP) Promotion Expenditures, 1995 to 2020



Source: Data from Dairy Management Inc., Milk Processor Education Program, and U.S. Department of Agriculture.

Nominal seasonally adjusted, demand-enhancing expenditures by DMI, MilkPEP, and QPs for all dairy products (fluid and manufacturing) combined on a quarterly basis from 1995 to 2020 are exhibited in Figure 3-2. These demand-enhancing expenditures varied from \$54.2 million to \$99.4 million per quarter, averaging \$82.3 million.

Nominal seasonally adjusted demand-enhancing expenditures for fluid milk from DMI, MilkPEP, and QPs on a quarterly basis from 1995 to 2020 are exhibited in Figure 3-3. Over that period, nominal seasonally adjusted quarterly promotion program expenditures for fluid milk ranged from roughly \$19.6 million to \$63.3 million per quarter and averaged \$33.4 million per quarter.

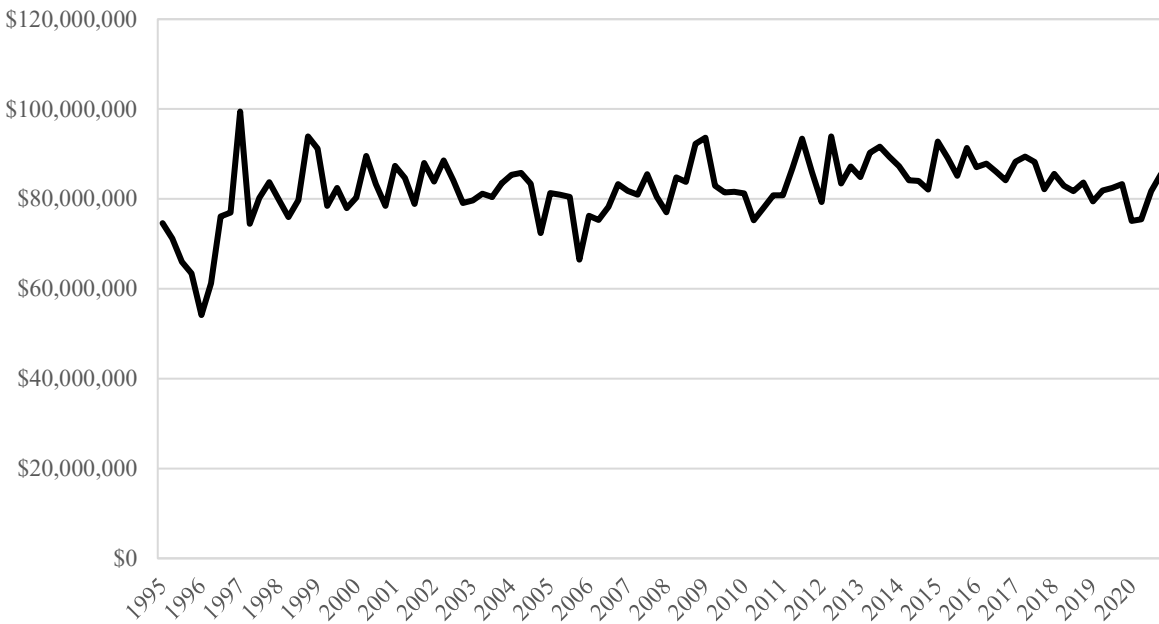
As exhibited in Figure 3-4, over the period 1995 to 2020, nominal seasonally adjusted demand-enhancing expenditures for cheese averaged \$15.6 million per quarter, ranging from \$8.0 million to \$27.7 million. Nominal seasonally adjusted demand-enhancing expenditures for cheese ranged from \$12.8 million to \$27.7 million between 1995 and 2004, averaging \$21.8 million per quarter. From 2005 to the third quarter of 2008, promotion expenditures associated with cheese were much smaller compared to the period of 1995 to 2004, averaging \$12.0 million during this period. From the fourth quarter of 2008 through the end of 2019, nominal quarterly expenditures on cheese marketing and promotion activities ranged from \$8.0 million to \$17.1 million, averaging \$11.7 million per quarter.

As shown in Figure 3-5, nominal seasonally adjusted demand-enhancing quarterly expenditures on marketing and promotion of butter ranged from close to \$60,000 to \$6.8 million, averaging close to \$1.4 million per quarter over the period 1995 to 2020. Marketing and promotion expenditures for butter are a fraction of the expenditures for fluid milk and cheese.

Beginning in 2006, DMI transitioned from featuring milk, cheese, and butter in product-specific promotions to broader campaigns that relate to several dairy products. As a result of an increasing number of campaigns affecting multiple products, assessing demand enhancements for the aggregate of dairy products as well as within specific product classes is important. Programmatic expenditures include a pro-rata share of non-specific promotion efforts.

DMI also invests in dairy export promotion through the U.S. Dairy Export Council. Nominal seasonally adjusted DMI expenditures directed to dairy export promotion on a quarterly basis ranged from just under \$800 to approximately \$7.0 million (Figure 3-6a). These expenditures trended upward from 1995 to 2020, averaging about \$2.9 million per quarter over this period. As exhibited in figure 3-6b, nominal seasonally adjusted funds awarded through USDA’s Foreign Agricultural Service (FAS) directed to exports of dairy products varied from just under \$314,000 to about \$2.4 million, averaging nearly \$1.2 million per quarter over the period of 1997 to 2020. The funds are awarded through USDA, FAS’s Foreign Market Development (FMD) program and the Market Access Program (MAP). The aggregate of DMI and FMD/MAP expenditures (nominal, seasonally adjusted) ranged from \$881 to \$9.0 million per quarter, averaging close to \$4.0 million on a quarterly basis over the same period from 1995 to 2020 (Figure 3-6c).

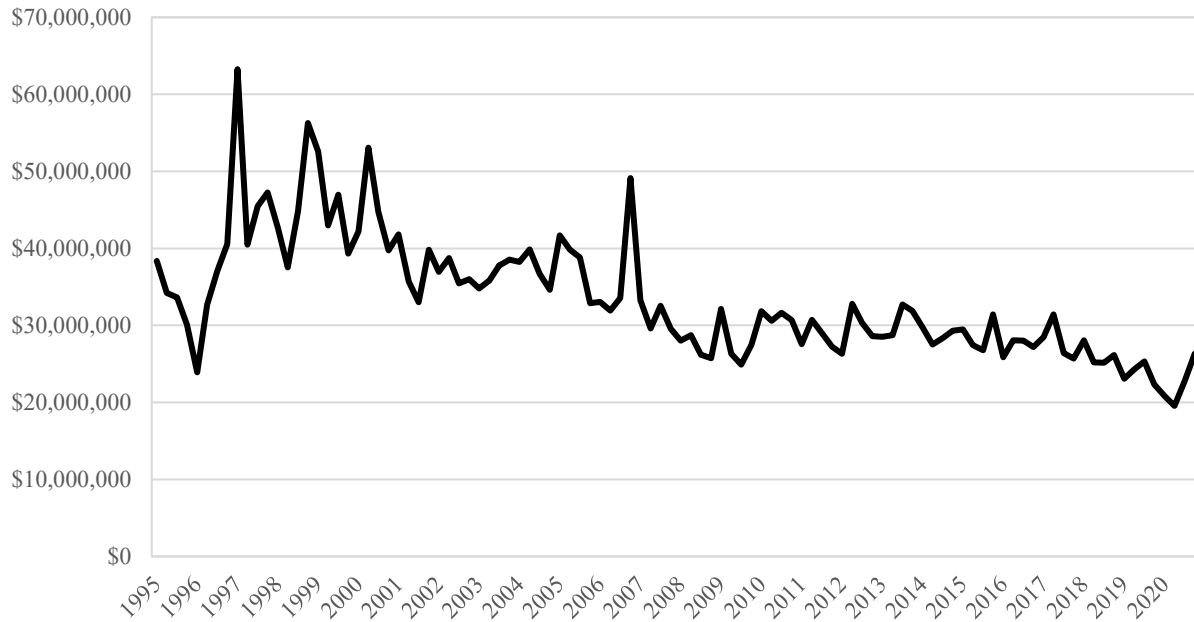
Figure 3-2. Quarterly All Dairy Products Promotion Expenditures (Nominal, Seasonally Adjusted) by Dairy Management Inc. (DMI), Milk Processor Education Program (MilkPEP), and Qualified Programs (QPs), 1995 to 2020*



* Includes expenditures for advertising, promotion, dairy foods and nutrition research, nutrition education, and market and economic research.

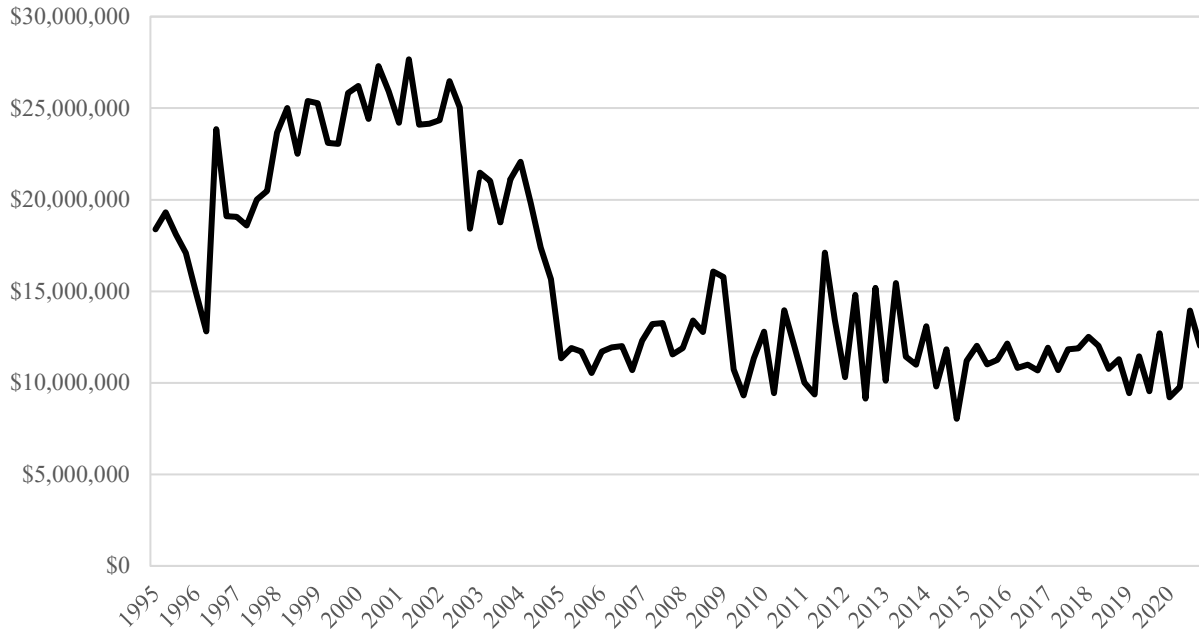
Source: Data from DMI, MilkPEP, and QPs. Calculations by the authors.

Figure 3-3. Quarterly Fluid Milk Promotion Expenditures (Nominal, Seasonally Adjusted) by Dairy Management Inc. (DMI), Milk Processor Education Program (MilkPEP), and Qualified Programs (QPs), 1995 to 2020



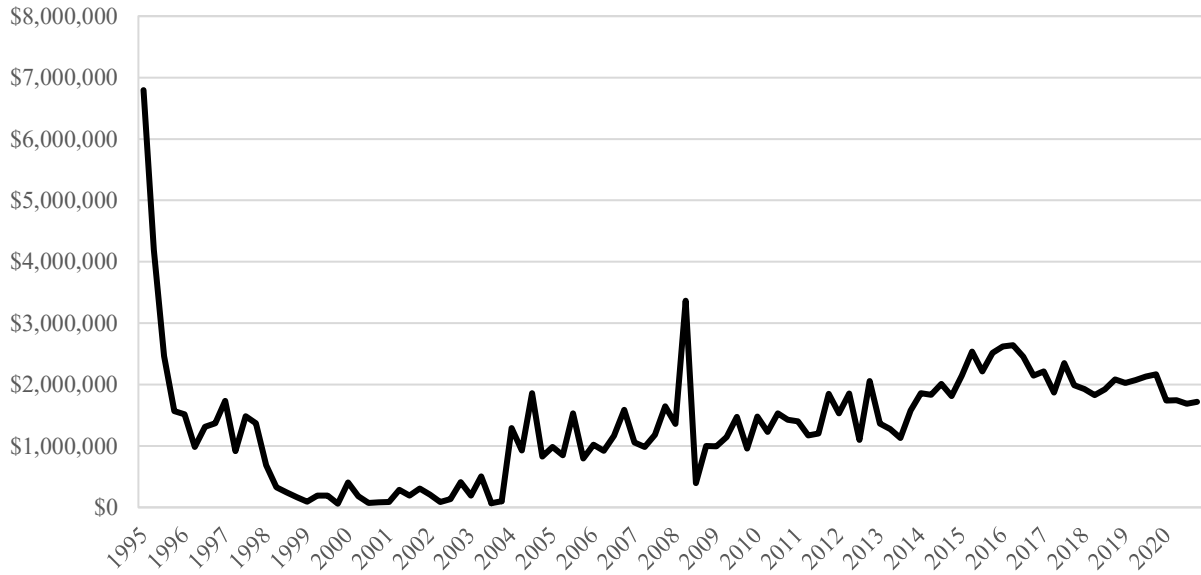
Source: Data from DMI, MilkPEP, and QPs. Calculations by the authors.

Figure 3-4. Quarterly Cheese Promotion Expenditures (Nominal, Seasonally Adjusted) by Dairy Management Inc. (DMI) and Qualified Programs (QPs), 1995 to 2020



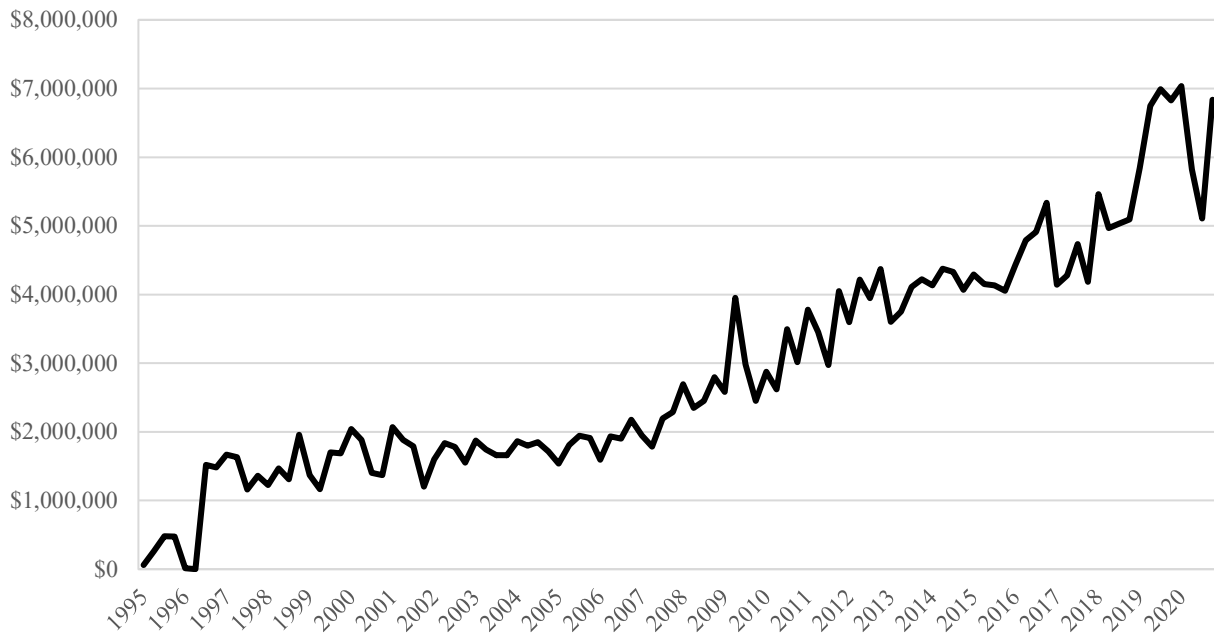
Source: Data from DMI and QPs. Calculations by the authors.

Figure 3-5. Quarterly Butter Demand-Enhancing Expenditures (Nominal, Seasonally Adjusted) by Dairy Management Inc. (DMI) and Qualified Programs (QPs), 1995 to 2020



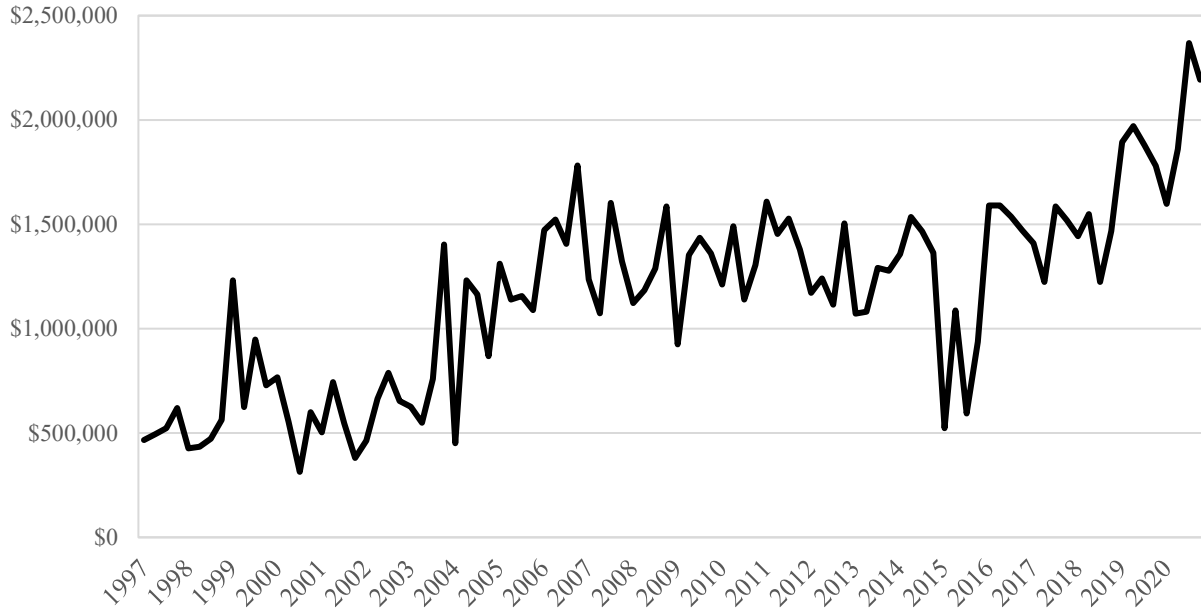
Source: Data from DMI and QPs. Calculations by the authors.

Figure 3-6a. Quarterly Dairy Product Export Expenditures (Nominal, Seasonally Adjusted) by Dairy Management Inc. (DMI), 1995 to 2020



Source: Data from DMI. Calculations by the authors.

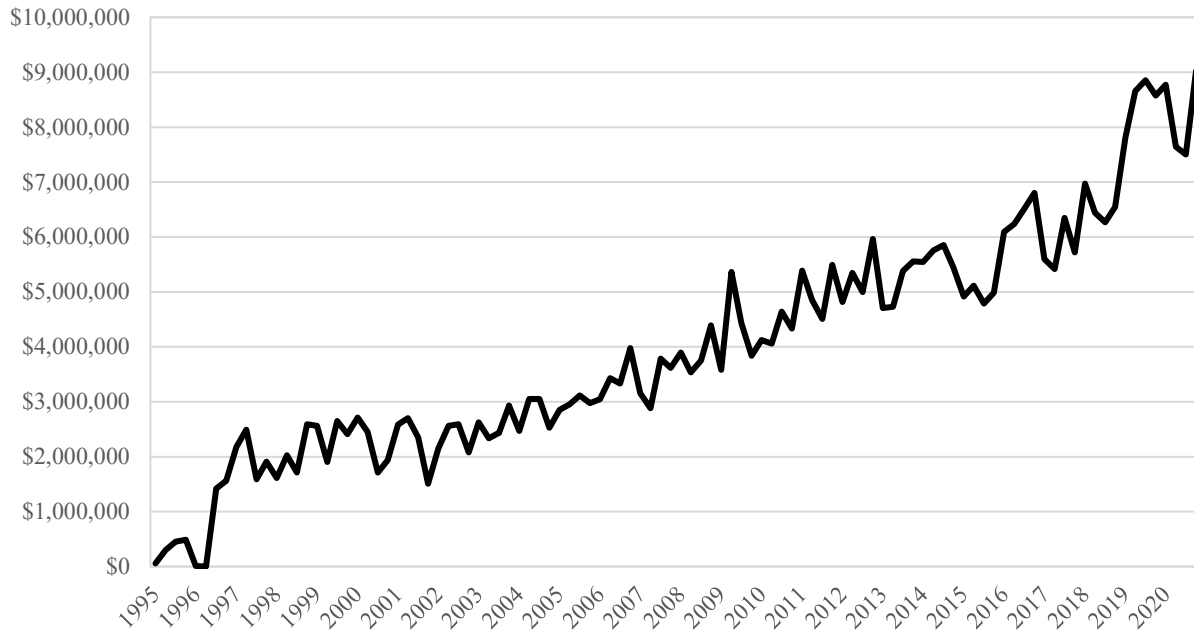
Figure 3-6b. Quarterly Dairy Product Export Expenditures (Nominal, Seasonally Adjusted) through the Foreign Market Development/Market Access Programs, 1997 to 2020*



*Data were not available prior to 1997. Also, only annual data were available for 1997 and 1998; quarterly interpolations were made for these years.

Source: Data from U.S. Department of Agriculture, Foreign Agricultural Service. Calculations by the authors.

Figure 3-6c. Quarterly Aggregate Dairy Product Export Expenditures (Nominal, Seasonally Adjusted) by Dairy Management Inc. (DMI) and the Foreign Market Development/Market Access Programs, 1995 to 2020



Source: Calculations by authors.

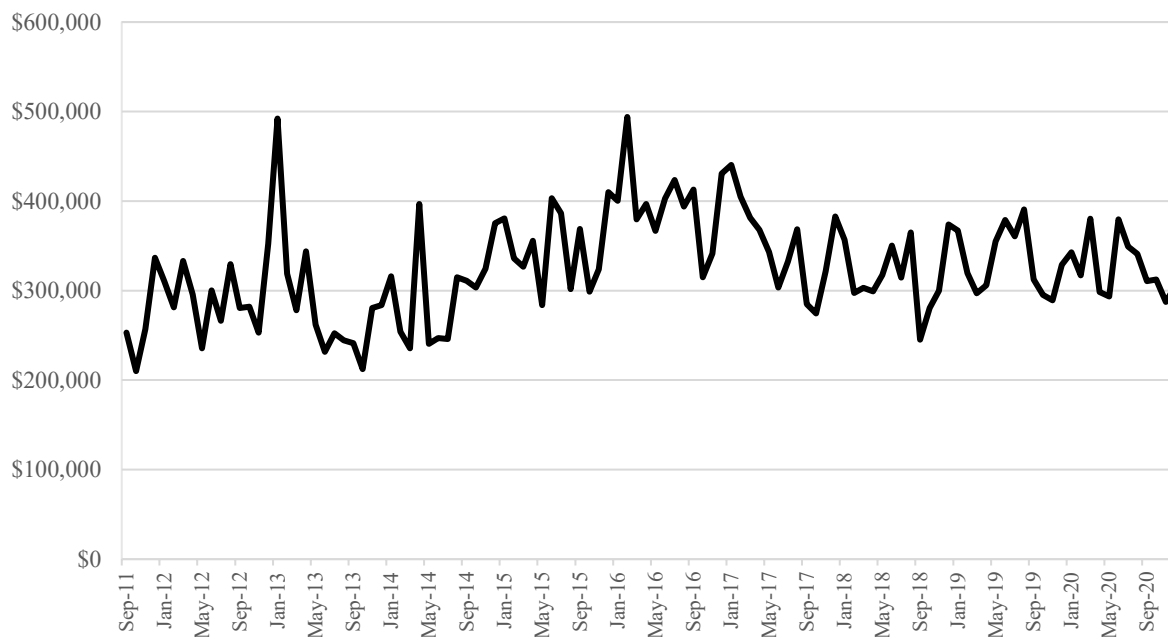
The assessment that importers of dairy products have paid to the National Dairy Promotion and Research Program effective August 1, 2011, is based on milk content as follows:

“This rule requires importers to calculate assessments due based upon documentation concerning the cow’s milk solids content of the imported products. Products shall be assessed at the rate of \$0.01327 per kilogram of cow’s milk solids.”

(Agricultural Marketing Service, 2011, “Rules and Regulations,” *Federal Register*, Volume 76, No. 53, page 14479).

Two-thirds of the import assessment are allocated to the National Dairy Board. The remaining amount can be designated to be used by one of three QPs to support dairy promotion: (1) Cheese Importers Association of America; (2) Global Dairy Platform; and (3) the Wisconsin Milk Marketing Board, Inc. Import assessment funds, collected on a monthly basis, totaled between \$3.44 million and \$4.76 million per year from 2012 to 2020, averaging \$3.93 million. The cumulative import assessment funds totaled \$36.44 million from September 2011 to December 2020. Funds from the dairy import assessment ranged from \$210,086 to \$493,975 per month, averaging \$325,397 per month over the period of September 2011 to December 2020 (Figure 3-7). The import assessment averaged just under 1.0 percent of the total demand-enhancing expenditures made by DMI, MilkPEP, and the QPs between 2012 and 2020.

Figure 3-7. Monthly Dairy Import Assessment Funds, September 2011 to December 2020



Source: U.S. Department of Agriculture

Trends in Dairy Use

Per capita fluid milk consumption trended downward between 1995 and 2020 (Figure 3-8). In 2020, quarterly per capita consumption of fluid milk ranged from 33.56 to 36.32 pounds per person, down from 50.44 to 53.20 pounds per person in 1995. Seasonality also is evident in per capita U.S. consumption of fluid milk. The downward trend likely reflects changes in the frequency of fluid milk intake rather than changes in portions (Stewart, Dong, and Carlson, 2013; and Stewart, Kuchler, Dong, and Cessna, 2021). Most Americans born in the 1990s tend to consume fluid milk less often than those born in the 1970s, who in turn consume fluid milk less often than those born in the 1950s. Annual U.S. per capita milk consumption has declined roughly 37 percent since 1995 largely due to changing consumption habits as well as increased competition from other beverages.

Cheese consumption per capita has grown over time and exhibits seasonal patterns (Figure 3-9). Between 1995 and 2020, the commercial per capita disappearance of cheese ranged from 6.42 pounds to 10.10 pounds per quarter, averaging close to 8.2 pounds.

Over the same period, per capita butter consumption grew modestly and exhibited seasonal patterns as well (Figure 3-10). The commercial disappearance of butter on a per capita basis ranged from 0.89 to 1.88 pounds per quarter, averaging 1.26 pounds.

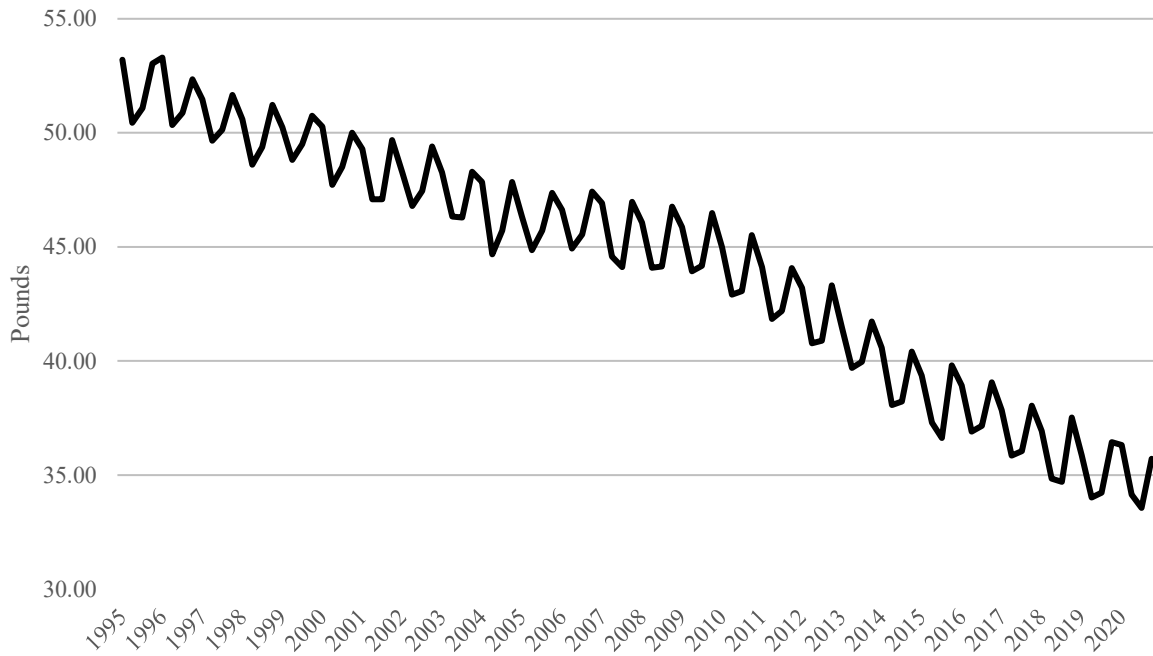
On average over the period 1995 to 2020, the per capita commercial disappearance of all dairy products on a fat basis averaged 152.89 pounds per quarter, ranging from 136.58 pounds to 173.95 pounds per quarter (Figure 3-11). On a skim-solids basis, the per capita commercial disappearance of all dairy products over that same period averaged 136.84 pounds per quarter, ranging from 130.41 pounds to 143.28 pounds per quarter (Figure 3-12).

Between 1995 and 2020, quarterly dairy exports on a fat basis averaged 1,472 pounds and averaged 6,168 pounds on a skim-solids basis (Figure 3-13).

The United States imported between \$2.825 billion and \$3.523 billion in dairy products annually from 2012 to 2020 (Table 3-2). Cheese products accounted for 34.40 percent to 43.53 percent (by value) of all dairy imports (Figure 3-14). Cheese imports as a percentage of total dairy imports were highest in 2018 at 43.53 percent and lowest in 2012 at 34.40 percent.

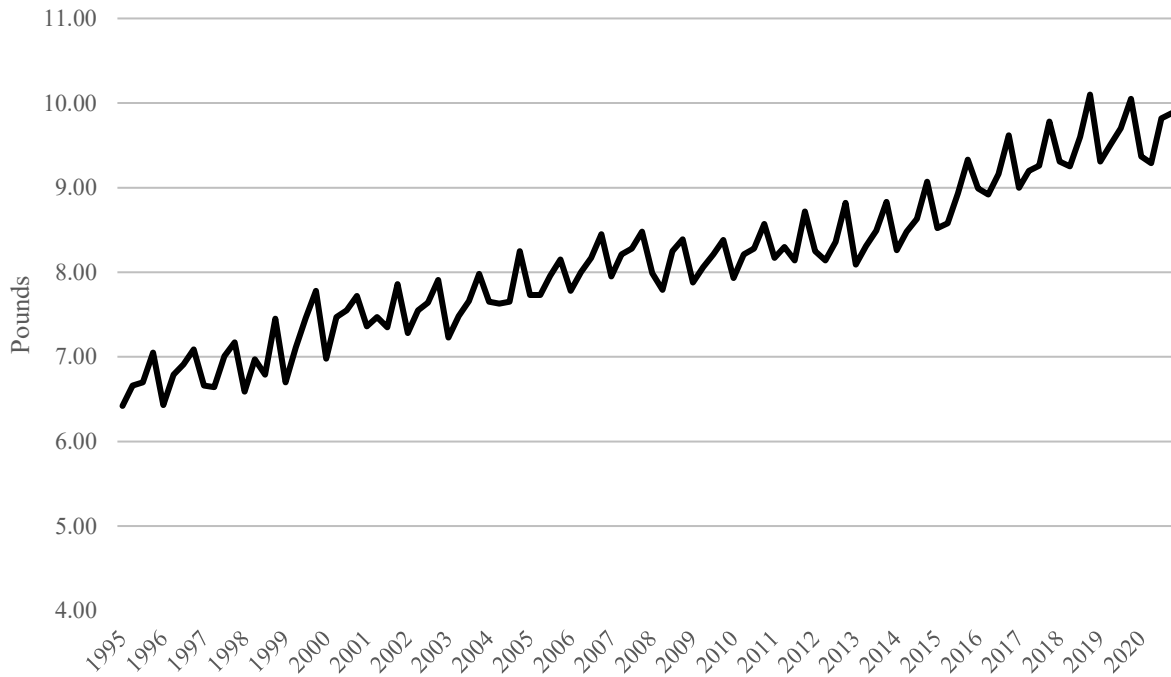
The analysis in the next section addresses the response of consumers to dairy promotion expenditures. Structural econometric models were developed to isolate the effects of those expenditures on demand for dairy products from those of other fundamental economic forces such as price and income.

Figure 3-8. Quarterly Per Capita U.S. Consumption of Fluid Milk, 1995 to 2020



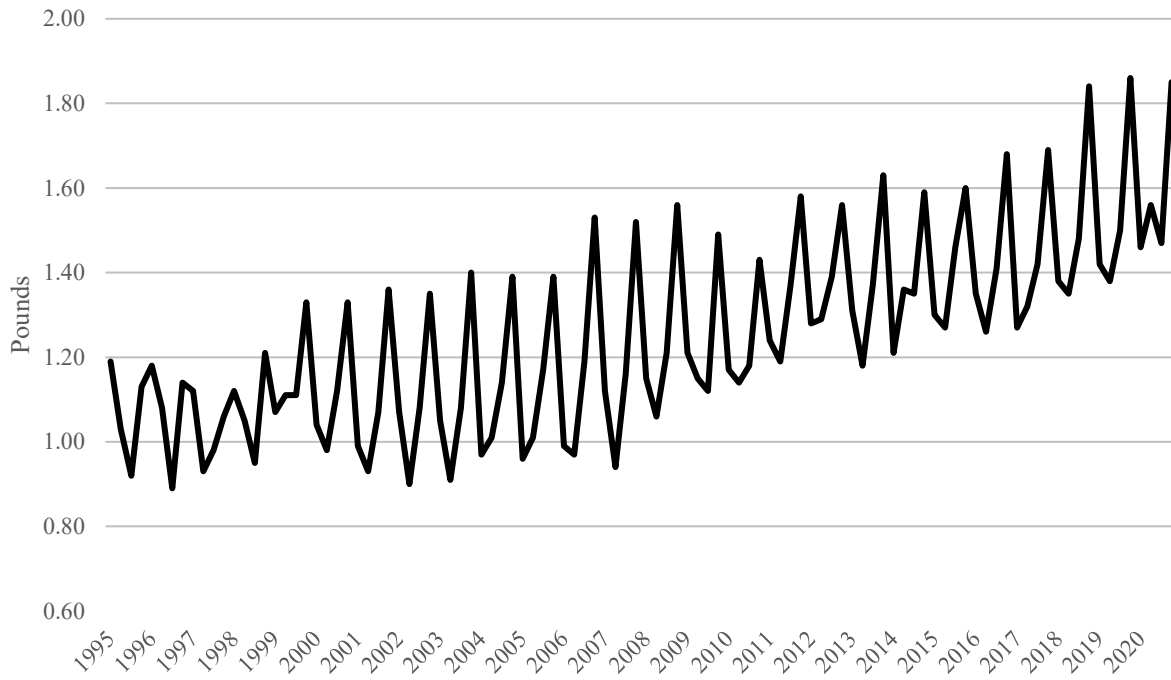
Source: U.S. Department of Agriculture.

Figure 3-9. Quarterly Per Capita U.S. Consumption of Cheese, 1995 to 2020



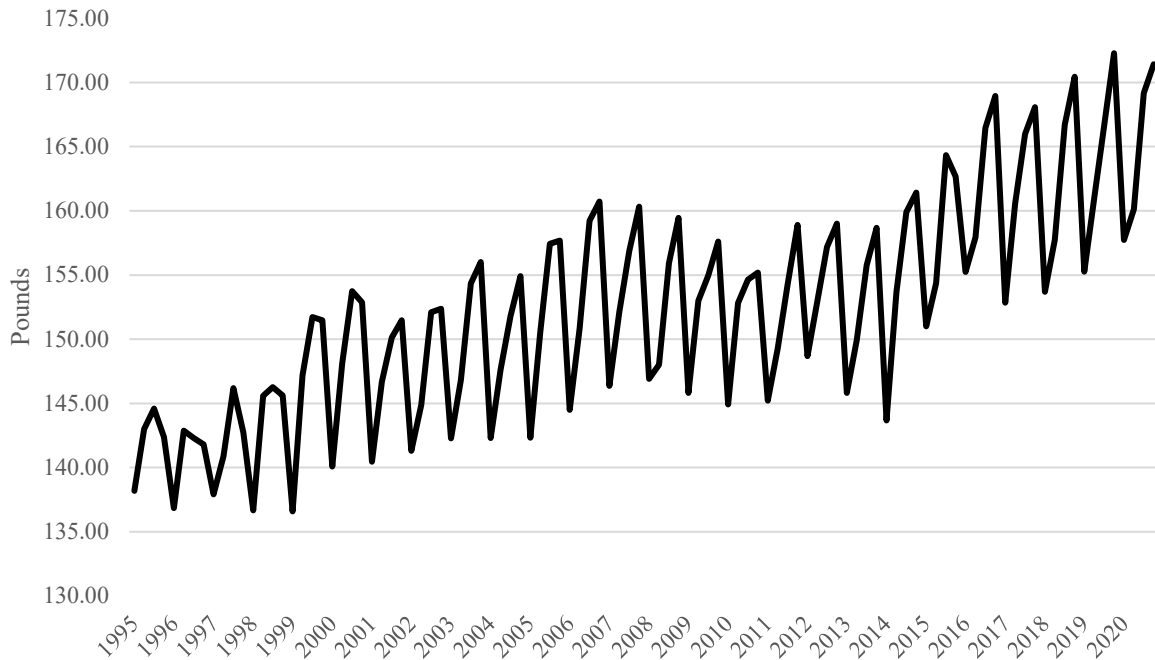
Source: U.S. Department of Agriculture.

Figure 3-10. Quarterly Per Capita U.S. Consumption of Butter, 1995 to 2020



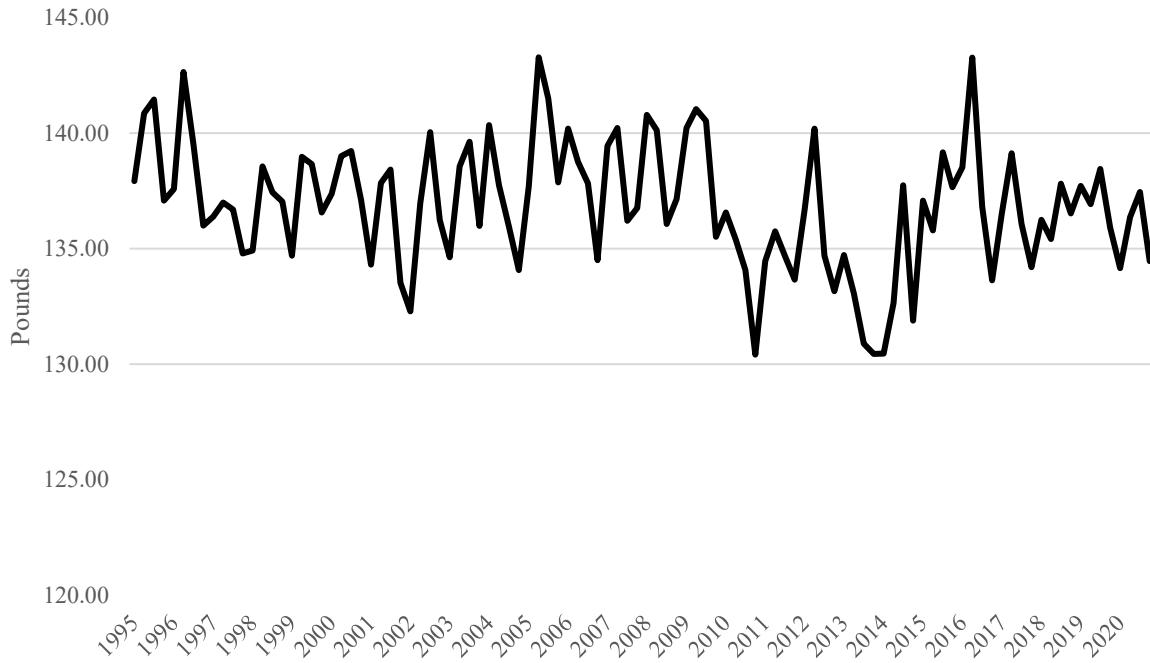
Source: U.S. Department of Agriculture.

Figure 3-11. Quarterly Per Capita U.S. Consumption of All Dairy Products on a Milk-Equivalent Fat Basis, 1995 to 2020



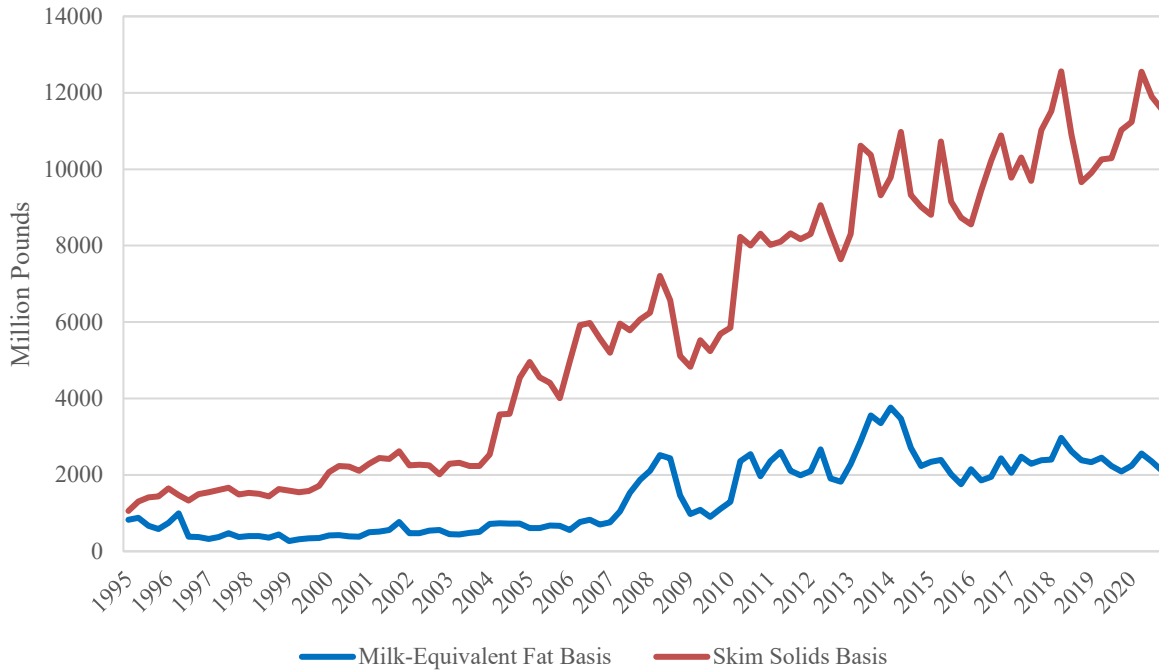
Source: U.S. Department of Agriculture and calculations by the authors.

Figure 3-12. Quarterly Per Capita U.S. Consumption of All Dairy Products on a Skim-Solids Basis, 1995 to 2020



Source: U.S. Department of Agriculture and calculations by the authors.

Figure 3-13. Quarterly U.S. Dairy Commercial Exports on a Milk-Equivalent Fat Basis and Skim-Solids Basis, 1995 to 2020



Source: U.S. Department of Agriculture and calculations by the authors.

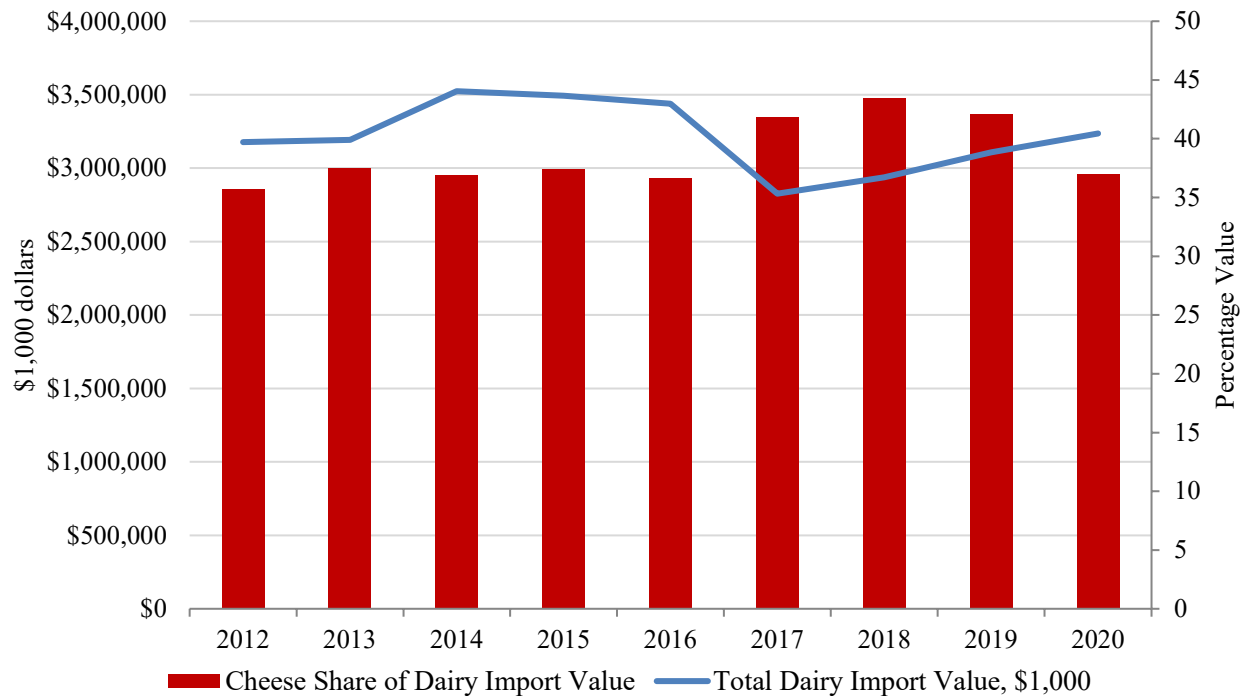
Table 3-2. U.S. Dairy Product Imports and Import Assessment Funds, 2012 to 2020¹

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Value of All Dairy Imports (\$1,000)	\$3,177,044	\$3,192,644	\$3,523,668	\$3,492,601	\$3,437,642	\$2,825,985	\$2,938,045	\$3,108,168	\$3,236,291
Value of Cheese Imports (\$1,000)	\$1,093,027	\$1,145,001	\$1,274,747	\$1,290,785	\$1,262,798	\$1,179,103	\$1,279,041	\$1,307,877	\$1,192,831
Quantity of Cheese Imports, (metric tons)	153,964	147,195	164,778	197,768	205,286	182,400	176,167	179,776	165,790
Unit Value of Cheese Imports (\$/MT)	\$7,099	\$7,779	\$7,736	\$6,527	\$6,157	\$6,464	\$7,260	\$7,275	\$7,195
Import Assessment Funds (\$)	\$3,521,054	\$3,441,461	\$3,564,781	\$4,175,783	\$4,757,469	\$4,205,885	\$3,803,099	\$4,000,574	\$3,917,344
Import Assessment per \$1,000 of dairy imports	\$1.11	\$1.08	\$1.01	\$1.20	\$1.38	\$1.49	\$1.29	\$1.29	\$1.21

¹ The import assessment went into effect August 1, 2011. Funds have been collected in each month from September 2011 to present. The table shows funds collected from January 2012 to December 2020.

Source: Import assessment data from the U.S. Department of Agriculture's (USDA's) Agricultural Marketing Service. Trade data from USDA's Foreign Agricultural Service.

Figure 3-14. Value of Total U.S. Dairy Imports and Cheese Share of Dairy Imports Value, 2012 to 2020



Source: Data from U.S. Department of Agriculture, Foreign Agricultural Service. Calculations by authors.

Findings on Impacts of Promotion Expenditures on Dairy Demand

The primary objective of the analysis is to answer two key questions regarding the National Programs over time: (1) What have been the effects of dairy promotion programs on the domestic consumption of fluid milk, dairy products, and exports? and (2) What have been the returns to dairy promotion programs? In answering the first question, the focus is on the effects of the dairy promotion program on the U.S. demand and exports of fluid milk and dairy products. Once those market effects have been determined, a benefit-cost analysis of the dairy program at the producer level and at the fluid milk processor level is done to answer the question about returns.

Estimation of Dairy Consumption and Export Changes Due to Promotion Program Expenditures

This evaluation study finds a statistically significant positive association between dairy promotion program expenditures and demand for dairy products. This association holds for all dairy products in the aggregate as well as for fluid milk, cheese, and butter.

The key indicator of the effect of promotion expenditures on dairy product demand is a measure of the relative sensitivity of demand to such expenditures. This measure, known as the promotion expenditure elasticity, is defined as the percentage change in consumption given a 1% change in promotion expenditures, holding all other variables constant.

The statistical analysis centers attention on the retail level of the marketing chain. The economic model provides structural parameter estimates that are statistically valid and consistent with prior studies in the literature on evaluation of generic commodity promotion.

Demand-enhancing expenditures have a statistically significant positive impact on domestic commercial disappearance of fluid milk, cheese, butter, and the aggregate of all dairy products as well as on dairy exports.

The promotion elasticities for butter, cheese, and fluid milk for 2020 were on average 0.045, 0.012, and 0.040, respectively. The promotion elasticities for all dairy products on a skim-solids basis and on a fat basis for 2020 were on average 0.058 and 0.047, respectively. Except for the promotion elasticity of fluid milk, this set of estimates aligns well with those reported in the previous Report to Congress based on data from 1995 to 2019.

The demand responsiveness to promotion was allowed to vary over time. Further, the cumulative impact of promotion was also identified. Demand-enhancing expenditures affect the market for cheese for up to two quarters. The effect on fluid milk persisted for up to eight quarters and on butter for up to 12 quarters. For the aggregate of all dairy products, the effect persisted for six quarters on both a fat and skim-solids basis.

To measure the effects of DMI export promotion enhancement expenditures on U.S. dairy commercial exports, two U.S. dairy export demand models were specified and estimated using two different data series for dairy exports supplied by USDA: (1) dairy exports on milk-equivalent skim-solids basis (SSB) and (2) dairy exports on a milk-equivalent fat basis (FB). The results indicated that when U.S. dairy prices were low (high) relative to Oceania dairy export

prices, the United States exported more (less) dairy products.² The lag length for SSB export promotion expenditures was estimated to be nine quarters. The SSB export promotion expenditure elasticity was estimated to be statistically significant at 0.058 over the sample period (Table 3-3). The lag length for the FB export promotion expenditures was estimated to be six quarters. The FB export promotion expenditure elasticity was estimated to be statistically significant at 0.093 (Table 3-3).

Simulation Analysis of the Market Effects of Dairy Promotion

The analysis covers the period of 1995 to 2020. The results are decomposed for comparison purposes into four time periods: (1) 1995 to 2000, (2) 2001 to 2006, (3) 2007 to 2013, and (4) 2014 to 2020. The analysis was accomplished by first aligning the annual model of the U.S. dairy industry maintained at the University of Missouri—the Agricultural Markets and Policy Group Dairy Model (AMAP Dairy Model) as modified to account for dairy promotion—with the observed data over the 1995 to 2020 period. Then the impact of promotion was obtained by removing demand-enhancing expenditures from the model. The model was first simulated over history to generate a “with promotion” scenario representing the effects of the dairy programs over actual history. A second “no promotion” scenario (the counterfactual scenario) was then generated by setting promotion expenditures to zero. The “zero promotion” scenario results represent the levels of prices and quantities that would have existed if the National Programs had not been created and, thus, dairy promotion had not been done.

The results for selected key variables in the model for the “with promotion” and “no promotion” scenarios are presented in Table 3-4 and Table 3-5. These tables provide a comparison of the “with promotion” levels of each variable (actual historical data) to the “no promotion” levels (simulated levels without promotion) to show the effects across time from dairy promotion spending. There are many factors at play in the year-by-year results, including the level of promotion expenditures each year and the supply dynamics built into the AMAP structural dairy model. To provide some insight into these model dynamics, four sub-periods of results are shown as well as the entire period for selected endogenous variables. The analysis starts in 1995 and, thus, does not include the effects of any dairy promotion that may have occurred prior to that year.

These results indicate that the overall downward trend of per capita fluid milk consumption between 1995 and 2020 was mitigated to some extent by the promotional efforts of the National Programs. Without the promotion programs, fluid milk consumption would have averaged 177.04 pounds per capita instead of the 191.10 pounds per capita that actually occurred over the 1995 to 2020 period with promotion. Hence, promotion expenditures associated with the National Programs spending on fluid milk reduced the rate of decline in per capita consumption, controlling for all other factors.

Because no other exogenous variable in the model (e.g., levels of inflation, exchange rates, income levels, government policies, etc.) other than dairy promotion expenditures is allowed to

² Key drivers of dairy demand were found to include the ratio of the Oceania export butter price to the U.S. butter price on a fat basis, the ratio of the Oceania export price for skim milk powder (SMP) to the U.S. nonfat dry milk (NDM) price on a skim-solids basis, a measure of real world income, seasonality, and inertia or stickiness of dairy exports in world markets.

change in either scenario, this analytical process effectively isolates the effects of the National Programs on U.S. dairy markets and exports. That is, the simulated differences between the values of the endogenous variables from the “with promotion” scenario and those from the “no promotion” scenario provide direct measures of the historical effects of the dairy promotion expenditures (and only those expenditures) on U.S. dairy markets and exports.

Table 3-3. Estimated Dairy Demand Sensitivity to Promotion, Prices, and Income, 1995 to 2020

	Promotion Elasticities		Own-Price Elasticity	Income Elasticity
	1995 to 2020	2020 only		
Butter	0.041	0.045	-0.046	0.397
Cheese	0.017	0.012	-0.139	0.407
Fluid milk	0.055	0.040	-0.038	-0.162
All dairy				
Skim-solids basis	0.067	0.058	-0.075	0.106
Fat basis	0.054	0.047	-0.071	0.393
Exports				
Skim-solids basis	0.058	0.058	-0.203	0.604
Fat basis	0.093	0.093	-0.277	0.644

As shown in Table 3-4, the average per capita domestic consumption of fluid milk, cheese, and butter was higher by 7.9 percent, 3.9 percent, and 5.3 percent, respectively, over the period of 1995 to 2020 due to promotion efforts, all other exogenous factors held constant. The average per capita consumption of nonfat dry milk (NFDm) would have been 3.08 pounds per capita annually without promotion versus 3.13 pounds per capita as actually occurred with promotion over the 1995 to 2020 period, an increase of 1.6 percent.

The results also indicate that the annual per capita domestic consumption of cheese would have averaged 31.26 pounds without promotion versus the 32.48 pounds as actually occurred with promotion over 1995 to 2020. For butter, per capita consumption would have averaged 4.75 pounds without promotion versus the 5.01 pounds that occurred with promotion over the same period. Table 3-5 shows exports of butter were lower by 24.3 percent, while exports of cheese were up by 5.0 percent over the same period because of the promotion programs. Exports of nonfat dry milk were up by a mere 0.1 percent over the period 1995 to 2020 due to the promotion programs.

Table 3-4. Effects of Dairy Promotion on U.S. Dairy Markets Based on Simulation of Supply Response – Per Capita Consumption

		Fluid Milk Per Capita Consumption (pounds)	Cheese Per Capita Consumption (pounds)	Butter Per Capita Consumption (pounds)	Nonfat Dry Milk Per Capita Consumption (pounds)	
Period	2014 - 2020	With Promotion (lbs)	166.73	37.00	5.88	2.94
		No Promotion (lbs)	155.33	35.57	5.50	2.86
		Change (lbs)	11.40	1.43	0.38	0.08
		Percent Change	7.3%	4.0%	6.7%	2.8%
	2007 - 2013	With Promotion (lbs)	193.95	33.06	5.14	3.23
		No Promotion (lbs)	178.25	31.72	4.86	3.16
		Change (lbs)	14.13	1.34	0.28	0.07
		Percent Change	7.9%	4.2%	5.8%	2.2%
	2001 - 2006	With Promotion (lbs)	199.97	30.99	4.49	3.23
		No Promotion (lbs)	184.70	29.83	4.33	3.19
		Change (lbs)	15.27	1.16	0.17	0.04
		Percent Change	8.3%	3.9%	3.8%	0.9%
	1995 - 2000	With Promotion (lbs)	209.18	28.02	4.35	3.15
		No Promotion (lbs)	193.30	27.14	4.18	3.15
		Change (lbs)	15.88	0.88	0.17	0.00
		Percent Change	8.2%	3.2%	3.8%	0.0%
	1995 - 2020	With Promotion (lbs)	191.10	32.48	5.01	3.13
		No Promotion (lbs)	177.04	31.26	4.75	3.08
		Change (lbs)	14.06	1.22	0.26	0.05
		Percent Change	7.9%	3.9%	5.3%	1.6%

Source: Calculation by the authors.

Table 3-5. Effects of Dairy Promotion on U.S. Dairy Markets Based on Simulation of Supply Response – Butter, Cheese, and Nonfat Dry Milk Exports

		Cheese Exports (million lb)	Butter Exports (million lb)	Nonfat Dry Milk Exports (million lb)	
Period	2014 – 2020	With Promotion	746.81	56.35	1,425.35
		No Promotion	716.25	70.00	1,352.56
		Change	30.56	-13.65	72.79
		Percent Change	4.3%	-19.5%	5.4%
	2007 – 2013	With Promotion	413.75	108.09	843.38
		No Promotion	392.69	123.83	831.65
		Change	21.06	-15.74	11.73
		Percent Change	5.4%	-12.7%	1.4%
	2001 – 2006	With Promotion	125.85	7.96	242.91
		No Promotion	113.41	23.71	266.07
		Change	12.44	-15.75	-23.16
		Percent Change	11.0%	-66.4%	-8.7%
	1995 – 2000	With Promotion	73.00	11.70	8.32
		No Promotion	72.11	29.71	80.92
		Change	0.89	-18.01	-72.60
		Percent Change	1.2%	-60.6%	-89.7%
	1995 – 2020	With Promotion	358.35	48.81	668.79
		No Promotion	341.37	64.51	668.13
		Change	16.98	-15.70	0.66
		Percent Change	5.0%	-24.3%	0.1%

Source: Calculation by the authors.

What then is the impact of the assessment on imports of dairy products? Given that cheese occupies a notable share of imported dairy products, we focus attention on the incremental amount of imports of cheese attributed to the importer assessment. Over the period 2012 to 2020, total cheese consumption in the United States amounted to 110.634 billion pounds. Because of the assessment from importers, total domestic cheese consumption was higher by roughly 55 million pounds. To arrive at this figure, we multiply 110.634 billion pounds by the percentage change in cheese consumption because of the importer assessment (0.05 percent as noted previously). Further, because cheese imports are roughly 2.5 percent of domestic consumption (United States Department of Agriculture), then due to promotion funds collected from importers, imported cheese levels were higher by 1.38 million pounds. Further, unit values of cheese imports amounted to roughly \$3.20 per pound on average annually between 2012 to 2020. Hence, incremental revenue to importers solely from cheese attributed to the import assessment totaled about \$4.42 million.

Dairy Promotion Program Benefit-Cost Analysis

This section provides a benefit-cost analysis of the National Programs based on the results of the scenario analyses discussed previously. As calculated, the producer profit BCR is the additional profit to the dairy industry (additional cash receipts net of additional production costs and promotion assessments) earned by producers because of the promotion expenditures (as measured through the scenario analyses) divided by the historical level of promotion

Table 3-6. Calculated Benefit-Cost Ratios (BCRs) at the Producer Level Attributed to the National Programs, 1995 to 2020

Producers	
Product	BCR
All Dairy	4.30
Fluid milk	1.91
Cheese	3.27
Butter	24.11
Exports	7.43
Other Non-Specific Dairy Promotion	6.93

expenditures made to generate those additional profits. The fluid milk processor BCR is calculated similarly to the producer BCR in which the cost of milk is used as a proxy for the cost of production since data pertaining to the cost of production for fluid milk processors are not available.

Based on the results exhibited in Table 3-4 and 3-5, the answer to the key question posed earlier regarding the National Programs, as it relates to the analyzed products, is that these programs have effectively increased the demand of promoted dairy products.

As exhibited in Table 3-6, over the period 1995 to 2020, the gains in profit at the producer level were far larger than the expenditures on demand-enhancement

programs. The BCRs for producers for fluid milk were calculated to be \$1.91 for every dollar invested in dairy demand promotion, for cheese \$3.27 for every dollar invested, and for butter \$24.11 for every dollar invested. For other non-specific dairy promotion activities, the BCR was calculated to be \$6.93 for every dollar invested. Dairy export promotion expenditures increased foreign demand for U.S. dairy products by \$7.43 for every dollar invested. For the aggregate of all dairy products, the net profit BCR is \$4.30 for every dollar invested. These BCRs or returns on investment (ROIs), except for fluid milk, correspond well with those reported in the previous Report to Congress. The BCR for fluid milk was previously reported to be 3.26.

Available expenditure data for the two participating entities in dairy promotion, DMI and MilkPEP, also allows for the calculation of separate BCRs at the farm level for the two groups. To address the effectiveness of the investments made by DMI and MilkPEP separately, we simulated “with promotion” and “without” promotion” scenarios for each of the two entities following the same methodology as for the aggregate analysis. DMI promotion expenditures have largely focused on promotion programs for fluid milk, cheese, butter, non-delineated products, and exports. By contrast, MilkPEP promotion expenditures have targeted fluid milk exclusively. The scenario simulation results indicate that the BCR associated with DMI spending only was calculated to be 5.43, higher than the 4.30 return on investment shown in Table 3-6 for all dairy product promotion investments. The BCR associated with MilkPEP spending only was calculated at 1.89, nearly identical to the 1.91 return calculated for all fluid milk promotional spending in Table 3-6. Recall that DMI demand-enhancing expenditures relate not only to fluid

milk but also to butter, cheese, other dairy products, and exports. MilkPEP demand-enhancing expenditures on the other hand relate only to fluid milk. As such, the respective calculated BCRs are in alignment with a priori expectations. In the previous Report to Congress, the BCR associated with DMI spending was calculated to be 5.59, while the BCR associated with MilkPEP spending was calculated to be 3.28.

The fluid milk processor BCR cannot be calculated as simply as the producer BCR since the cost-of-production data are not available. To calculate the fluid milk BCR, we use the cost of milk as a proxy for cost of production. The rationale for the use of this proxy is simply that the largest input processing cost is the cost of milk. The BCR for fluid milk at the processor level was estimated to be 2.84 over the period between 1995 and 2020. Importantly, this measure captures the gross return on investment for fluid milk market participants beyond the farm gate. Any additional costs incurred by these market participants from handling the larger volume of fluid milk that occurs due to MilkPEP promotion are excluded because we simply do not know the magnitude of these additional costs. Further, others in the marketing channel besides fluid milk processors capture a portion of this incremental total value too. But we have no knowledge of the portion captured by processors versus other milk market participants beyond the farm gate. As such, we exercise caution because of these caveats in providing this estimate of the BCR attributed to the promotion of fluid milk at the processor level over the 1995 to 2020 period. In the previous Report to Congress, this BCR was calculated to be 5.61.

Caution must be exercised in making comparisons from various Reports to Congress across years. The economic phrase/condition, *ceteris paribus*, meaning all other factors invariant, does not hold. The underlying endogenous and exogenous variables which come from various government sources have been revised and updated, and now four additional quarters of data are available not only pertaining to these variables but also pertaining to the data associated with the programmatic expenditures of the National Programs.

Concluding Remarks³

This report provides an independent evaluation of the effectiveness of the National Programs covering the period 1995 to 2020. The key findings regarding markets for milk and manufactured dairy products over that period include the following:

- The National Programs have effectively increased the demand for promoted dairy products, especially cheese and butter, and moderated the decline in per capita fluid milk consumption.
- The gains in profit at the producer and fluid milk processor level from promotion were far larger than the costs of the National Programs. The overall BCR (using change in profit net of costs) of the dairy producer promotion program was calculated to be 4.30. That is, for every \$1 spent on demand-enhancing activities, dairy producers received an additional \$4.30.
- The National Programs promotion spending over 1995 through 2020 enhanced per capita consumption of dairy products and cheese exports:

³ A reference list is available upon request.

- Fluid milk per capita +7.9 percent
 - Cheese per capita +3.9 percent
 - Butter per capita +5.3 percent
 - Nonfat dry milk per capita +1.6 percent
 - Butter exports -24.3 percent
 - Cheese exports +5.0 percent
 - Nonfat dry milk exports +0.1 percent
- Promotion funds collected from importers boosted the annual average level of cheese imports by 1.38 million pounds. Annual unit values of cheese imports amounted to about \$3.20 per pound over the period from 2012 to 2020. Hence, the incremental revenue to importers solely from cheese attributable to the expenditure of the import assessments for cheese promotion totaled roughly \$4.42 million.
 - The BCR for fluid milk promotion was calculated to be \$1.91 for every dollar invested in demand-enhancing activities. For cheese promotion, the BCR was calculated to be \$3.27 per dollar invested in cheese promotion and \$24.11 for every dollar invested in butter promotion. The BCR for dairy export promotion was calculated to be \$7.43 per dollar invested.

Regarding methodology, the analysis was accomplished by first statistically estimating the relationships between dairy product demands and the respective demand drivers including prices and promotion expenditures. The structural econometric models used for this analysis are statistically valid and largely consistent with prior studies evaluating generic commodity promotion. The annual model of the U.S. dairy industry maintained at the University of Missouri—the Agricultural Markets and Policy Group Dairy Model (AMAP Dairy Model)—was modified to include the statistical results of the dairy demand statistical analysis and then aligned with the observed data over the 1995 to 2020 period. The model was then simulated over history to generate a “with promotion” scenario representing the effects of the dairy programs over actual history. A second “no promotion” scenario (the counterfactual scenario) was then generated with the model over history in which promotion expenditures in the dairy product demand equations were set to zero. The second scenario’s results represent the levels of prices and quantities that would have existed if the National Programs had not been created and, thus, dairy promotion had not been done.

Dairy markets were disrupted in 2020 due to the pandemic associated with COVID-19. Because our data were quarterly, ending in December 2020, we did not believe we had sufficient data to properly account for the pandemic. Going forward in future evaluations of the effectiveness of the National Programs, we plan to account for the disruptions in dairy markets attributed to the pandemic.

Chapter 4

Qualified State, Regional, or Importer Dairy Product Promotion, Research, or Nutrition Education Programs

The Secretary annually certifies Qualified Programs as part of the Dairy Act and Order. To receive certification, the Qualified Program must meet the following criteria (7 CFR §1150.153):

1. Conduct activities intended to increase human consumption of milk and dairy products generally;
2. Be active and ongoing before passage of the Dairy Act, except for programs operated under the laws of the United States or any State and except for importer programs;
3. Be primarily financed by producers, either individually or through cooperative associations or dairy importers;
4. Not use a private brand or trade name in its advertising and promotion of dairy products (unless approved by the Dairy Board and USDA);
5. Certify that requests from producers or importers for refunds under the program will be honored by forwarding to either the Dairy Board or a Qualified Program designated by the producer or importer that portion of such refunds equal to the amount that would otherwise be applicable to that program; and
6. Not use program funds for the purpose of influencing governmental policy or action.

The aggregate revenue from the assessment directed to the Qualified Programs in 2020 was \$299 million (approximately 10 cents of the 15-cent producer assessment and 2.5 cents of the 7.5-cent import assessment). This chapter provides the aggregate income and expenditure data of the Qualified Programs as well as a list of certified programs in 2020.

**Qualified State, Regional or Importer
Dairy Product Promotion, Research or Nutrition Education Programs
Aggregate Income and Expenditure Data Reported to USDA, 2020**
(Thousands)

Aggregate Income	FY 2020
Carryover from Previous Year ¹	\$83,927
Producer Remittances	223,653
Transfers from Other Qualified Programs	86,790
Transfers to Other Qualified Programs	(102,631)
Other Income	7,822
Total Adjusted Annual Income	<u>\$299,561</u>
Aggregate Expenditures	FY 2020
General and Administrative	\$10,750
Milk Advertising and Promotion	11,457
Cheese Advertising and Promotion	29,595
Butter Advertising and Promotion	6,176
Frozen Dairy Products Advertising and Promotion	3,380
Other Advertising and Promotion ²	5,060
Unified Marketing Plan ³	85,311
Dairy Foods and Nutrition Research	7,861
Public and Industry Communications	19,649
Nutrition Education	13,932
Market and Economic Research	4,439
Other	5,535
Total Annual Expenditures	<u>\$203,145</u>
Total Available for Future Year Programs	\$94,165

¹ Differences can occur because of audit adjustments and varying accounting periods.

² "Other" includes "Real Seal," holiday, multi-product, calcium, foodservice, product donations at State fairs, and other promotional activities.

³ Unified Marketing Plan: Reported local spending by United Dairy Industry Association units participating in Dairy Management Inc.'s Unified Marketing Plan to fund national implementation programs.

Source: Data reported by Qualified Dairy Product Promotion, Research, and Nutrition Education Programs.

**Qualified State, Regional or Importer
Dairy Product Promotion, Research or Nutrition Education Programs, 2020**

Alabama:

American Dairy Association of Alabama
(Dairy Alliance)

Arizona:

Dairy Council of Arizona (Dairy
Management West)

California:

California Milk Advisory Board
Dairy Council of California

Connecticut:

Connecticut Milk Promotion Board

Florida:

Florida Dairy Farmers, Inc.

Georgia:

Georgia Agricultural Commodity
Commission for Milk
Southeast United Dairy Industry Association
(Dairy Alliance)
American Dairy Association of Georgia
(Dairy Alliance)

Idaho:

Idaho Dairy Products Commission
Dairy West

Illinois:

Illinois Milk Promotion Board

Indiana:

American Dairy Association of Indiana
Indiana Dairy Industry Development Board

Kansas:

Kansas Dairy Commission

Kentucky:

American Dairy Association of Kentucky
(Dairy Alliance)

Louisiana:

Louisiana Dairy Industry Promotion Board

Maine:

Maine Dairy and Nutrition Council
Maine Dairy Promotion Board

Massachusetts:

Massachusetts Dairy Promotion Board
New England Dairy and Food Council
(New England Dairy)
New England Dairy Promotion Board
(New England Dairy)

Michigan:

American Dairy Association of Michigan
Dairy Council of Michigan
Michigan Dairy Market Program

Minnesota:

Midwest Dairy Association (Midwest Dairy)
Midwest Dairy Council (Midwest Dairy)
Minnesota Dairy Research and Promotion
Council (Midwest Dairy)

Mississippi:

American Dairy Association of Mississippi
(Dairy Alliance)

Missouri:

Dairy Promotion, Inc.
Promotion Services, Inc.
St. Louis District Dairy Council

Nebraska:

Nebraska Dairy Industry Development
Board (Midwest Dairy)

Nevada:

Dairy Council of Nevada (Dairy
Management West)

New Hampshire:

Granite State Dairy Promotion

New Jersey:

New Jersey Dairy Industry Advisory Council

New York:

American Dairy Association & Dairy Council, (American Dairy Association Northeast)

Milk for Health on the Niagara Frontier
New York State Department of Agriculture,
Division of Milk Control and Dairy Services
Rochester Health Foundation, Inc.
(American Dairy Association Northeast)

North Carolina:

American Dairy Association of North Carolina (Dairy Alliance)

North Dakota:

North Dakota Dairy Promotion Commission (Midwest Dairy)

Ohio:

American Dairy Association Mideast

Oregon:

Oregon Dairy Products Commission

Pennsylvania:

Allied Milk Producers' Cooperative.
Mid-Atlantic Dairy Association
(American Dairy Association Northeast)
Pennsylvania Dairy Promotion Program
(American Dairy Association Northeast)

Puerto Rico, Commonwealth of:

Milk Industry Development Fund of Puerto Rico (Fondo Fomento Industria Lechera)

South Carolina:

American Dairy Association of South Carolina (Dairy Alliance)

South Dakota:

American Dairy Association of South Dakota (Midwest Dairy)

Tennessee:

American Dairy Association of Tennessee (Dairy Alliance)
Tennessee Dairy Promotion Committee (Dairy Alliance)

Texas:

Dairy MAX, Inc.
Western Dairy Association (Dairy MAX, Inc., Inactive)
Southwest Dairy Museum, Inc.
(Southwest Dairy Farmers, Southland Dairy Farmers)

Utah:

Utah Dairy Commission (Dairy West)

Vermont:

Vermont Dairy Promotion Council

Virginia:

American Dairy Association of Virginia (Dairy Alliance)

Washington:

Washington State Dairy Council (Dairy Farmers of Washington)
Washington Dairy Products (Dairy Farmers of Washington)

Wisconsin:

Wisconsin Milk Marketing Board (Dairy Farmers of Wisconsin)

Qualified Importer Programs:

Cheese Importers Association of America (Importer)
Wisconsin Milk Marketing Board (Dairy Farmers of Wisconsin)
Global Dairy Platform (Importer)

Dairy Management Inc. and U.S. Dairy Export Council Contracts Approved by USDA, 2020

Contractor Name [Contract Activities]:

B = Business Development
F = Fluid Milk Revitalization
N = Nutrition and Wellness
P = Partnerships

C = Communications
60 = Fuel Up to Play 60
I = Ingredients
S = Sustainability

Co = Consultants,
E = Exports,
K = Knowledge & Insights,
U = Unified Marketing Plan

84.51, LLC ^[P]
Academy of Nutrition and Dietetics ^[N]
Agile City Winston-Salem ^[B]
Agribusiness-Connect Asia ^[E]
Allende and Brea Sociedad Civil ^[E]
American Academy of Pediatrics ^[N]
American Butter Institute ^[U]
American Dairy Association Indiana, Inc. ^[U]
American Eagle.com ^[B]
American Society for Nutrition ^[N]
American-Mexican Marketing ^[E]
Aon Consulting, Inc. ^[B]
Arab Marketing Finance, Inc. ^[E]
Armano Design Group ^[C]
Arochi & Lindner, S.C. ^[K]
Artisanal Touch Events, LLC ^[I]
Associated Milk Producers, Inc. ^[P]
AVID Intellectual Property Law ^[B]
Bader Rutter and Associates, Inc. ^[C, E, S]
Baird, Spencer ^[Co]
Baxter Communications, Inc. ^[C]
Bethany Yon ^[Co]
Black Sea Consulting, LLC ^[K]
Black Swan Data Ltd. ^[K]
Bliming and Associates, Inc. ^[E]
Bobo, Jack ^[Co]
Bovina Mountain Consulting LLC ^[B]
Brainyak Inc. dba GutCheck ^[C]
Brandteam Partners, LLC ^[C]
CadmiumCD, LLC ^[S]
Cady, Roger ^[Co]
Castlewood Strategies, LLC ^[N]
CFE Solutions, Inc. ^[Co]
Chase Nutrition Services, LLC ^[N]
CNS Media ^[C]
College & Professional Sports Dieticians ^[N]

ConferenceDirect, LLC ^[B]
Costco Wholesale Corporation ^[B, K]
Cowboy Media Productions, LLC ^[C, E]
CRA Inc. ^[C]
Craigson Innovation Group, LLC ^[K]
Culinary Sales Support, Inc. ^[I]
CustomED ^[C]
Czymmek, Karl ^[Co]
Dairy Council of Utah ^[U]
Dairy Farmers of America ^[P]
Dairy Girl Network ^[B]
Dairy Insights, LLC ^[Co, E]
Dairy Max, Inc. ^[U]
Darigold, Inc. ^[P]
David S. Smith America, Inc.
 d/b/a Worldwide Dispensers ^[Co]
Davies Collison Cave Pty, Ltd ^[K]
Delahoyde Projects ^[C]
Digital SpeakEasy, LLC ^[C, S]
Discovery Education, Inc. ^[C]
Domino's Pizza Enterprises – Japan ^[E]
Domino's Pizza Enterprises – Oceania ^[E]
Domino's Pizza, LLC ^[P]
Dorantes Advisors ^[K]
Dr. Siti Noorbaiyah Abdul Malek ^[Co]
DuPuis Group ^[C, F]
Dutcher & Associates, LLC ^[C]
EarthShift Global, LLC ^[S]
EAS Consulting Group ^[I]
Eastern Trade Media Pte, Ltd ^[C]
Edelman Public Relations Worldwide ^[C, 60]
Ernst & Young Global Limited ^[B]
Euromonitor International ^[E]
Exponent, Inc. ^[K]
Farm Journal Foundation ^[B]
Feeding America ^[P]

Fleishman-Hillard, Inc. ^[C]
 Florida Dairy Farmers, Inc. ^[U]
 Food Allergy Research and Education ^[N]
 Food Research and Action Center ^[N]
 FoodMinds, A Division of Padilla Speer
 Beardsley, Inc. ^[E, I]
 Foodsense, LLC ^[C, N]
 FreshAgenda Pty, Ltd ^[I]
 Gaalswyk, Dennis ^[Co]
 Global Dairy Platform, Inc. ^[C]
 GlobalData Plc (Canadean Consumer) ^[E, K]
 Godfrey & Kahn S.C. ^[K]
 Golin Harris International, Inc. ^[C]
 Great Valley Publishing Company ^[N]
 Harbor Environmental ^[S]
 Hartman Group ^[K]
 Hebrew Rehabilitation Center ^[K]
 HGC Studio, LLC ^[C]
 Hickey, Bob ^[Co]
 Hillstrom Communications, Inc. ^[C]
 Hodges, Heather ^[Co]
 Hruska, Cindy ^[B, E]
 Hubert Company ^[B]
 Hudson Grey Sky Productions, LLC ^[C]
 Hutchinson Cancer Research Center ^[K]
 Imperial Marketing Concepts, Inc. ^[C]
 Information Resources, Inc. ^[B]
 Inmar Analytics, Inc. ^[K]
 Innova Market Insights ^[K]
 Institute for the Future ^[K]
 International Dairy Foods Association ^[B, K]
 IntNet (South Korea) ^[E]
 Ipsos Insights, LLC ^[I]
 ISOS Group, LLC ^[S]
 JF Pontzer, LLC ^[C]
 Jiangnan University ^[K]
 Johnson, Rachel ^[Co]
 Joslin Diabetes Center, Inc. ^[N]
 Kantar, LLC d/b/a Kantar TNS ^[C]
 Kantar Retail d/b/a Kantar Worldpanel ^[K]
 Keenan, Judy ^[Co]
 Kentucky Fried Chicken International
 Holdings, LLC ^[P]
 KJ Marketing Consulting ^[60]
 Koski, Shannon ^[C, E]
 Land O'Lakes, Inc. ^[P]
 Lee, Jay ^[Co]
 Leombruni, Lisa ^[Co]
 Leverette, Weekes & Co., Inc. ^[B]
 Lieberman Research Worldwide, Inc. ^[C]
 Lux Research, Inc. ^[F]
 Maine Dairy Promotion Board ^[U]
 Mandell, Laura ^[Co]
 Market Makers, Inc. ^[E]
 MB Clinical Research and Consulting, LLC
^[K]
 McClelland, Alyssa ^[Co]
 McDonald's USA, LLC ^[P]
 Meltwater ^[C]
 Meros Consulting ^[Co]
 Messina Group, Inc. ^[B]
 Mintel Group, Ltd. ^[K]
 MMS Education, Inc. ^[C, N, 60]
 Morris, James ^[Co]
 MSL Global Singapore ^[E]
 National Football League Players, Inc. ^[60]
 National Football League Properties ^[60]
 National Milk Producers Federation ^[E, K]
 National Strength and Conditioning
 Association ^[K]
 Natural Marketing Institute ^[K]
 New England Dairy & Food Council, Inc. ^[U]
 Nielsen Holdings, Inc. ^[K]
 Novak Birch ^[C, E]
 NPD Group, Inc. ^[K]
 Nutrition Impact, LLC ^[N]
 Nutrition Insights, LLC ^[N]
 Nutritional Strategies, Inc. ^[N]
 Nygaard Consulting, LLC ^[E, K]
 O'Donohue, Katherine ^[Co]
 On the Go Marketing, Corp. ^[F]
 Orrani Consulting, Ltd. ^[E, K]
 Package InSight, LLC ^[F]
 Papa John's International, Inc.,
 d/b/a Papa Johns ^[P]
 Paradox Nutrition, LLC ^[I]
 Parenti Partners dba Culinary Garage ^[C]
 Paustian, Keith ^[Co]
 Pizza Hut, LLC ^[P]
 Pizza Hut Restaurants Asia Pte., Ltd. ^[P]
 PR Consultants Limited ^[E]
 Prime Consulting of Florida ^[F]

Public Policy Asia ^[E]
Quaife, Tom ^[Co]
RB International ^[Co]
Ready Ink Communications ^[C, E]
Renee Comet Photography, LLC ^[C]
Research Resources ^[I]
Results Direct ^[C, E]
Rise Interactive Media & Analytics, LLC ^[C]
River Global, LLC ^[E]
Rogers, Paul ^[Co, E]
RTI International ^[N]
Ruby Do, Inc. ^[C]
Rudder Library Services ^[B]
Rudder, Donna ^[Co]
Salesforce.com, Inc. ^[B]
Shainwright Consulting & Research Group ^[E]
Shamrock Farms ^[P]
Shamrock Foods Company ^[P]
Sheryl Stern Sachman & Associates, LLC ^[N]
Shiftology Communication ^[C]
Sidley Austin, LLP ^[K]
Significant Outcomes ^[E]
Sikand, Vadna ^[Co]
Sohn's Market Makers ^[E]
Sopexa ^[E]
Sorenson, Carla ^[Co]
Southeast United Dairy Industry Association
d/b/a The Dairy Alliance ^[U]
sparks & honey, LLC ^[C, K]
Spherix Consulting Group ^[B]
Spire Research and Consulting ^[Co, E]
Sports Science Insights, LLC ^[K]
Stoury Creative, LLC ^[C]
Strategic Conservation Solutions, LLC ^[C]

Strategy Muse ^[K]
SWC Technology Partners, LLC ^[B]
Taco Bell Corporation ^[P]
Taylor, Tammy ^[Co]
Team Services, LLC ^[60]
Technomic, Inc. ^[K]
Texas A&M AgriLife Research ^[K]
The Context Network, LLC ^[S]
The Economist Intelligence Unit, NA, Inc. ^[K]
The Family Room ^[C]
The Foundation for National Institutes of Health ^[N]
The Fresh Approach, Inc. ^[C]
The Kroger Company ^[P]
The McCully Group ^[E, I]
Think Healthy Group, Inc. ^[C]
TNS Custom Research, Inc.
d/b/a Kantar Worldpanel ^[K]
TradeMoves, LLC ^[E, K]
United Dairymen of Arizona ^[U]
United States Farmers and Ranchers ^[B]
USDA Agriculture Research Service,
Western Human Nutrition Research Center ^[K]
Volp, Lori ^[Co]
Waldvogel, Jay ^[Co]
Washington Dairy Products Commission ^[U]
Watkinson & Miller ^[B]
Watson Green, LLC ^[B, N, U]
Weber Shandwick Worldwide ^[C]
Williams, Alexa ^[U]
Youth Improved Inc. d/b/a GenYouth ^[N, 60]
Ypulse, Inc. ^[C]
Yum! Restaurants International, Inc. ^[P]
Zenith International Ltd. ^[E, I]

National Fluid Milk Processor Promotion Board Contracts Approved by USDA, 2020

Contractor Name [Contract Activities]:

A = Advertising and Marketing B = Business Development
K = Knowledge and Insights P = Partnerships

37 Front St, LLC ^[K]	Dunston, Rachel ^[A]
AAG Unlimited ^[A]	eatbigfish, LLC ^[A]
Anderson, Tyler ^[A]	Egg Strategy, Inc ^[K]
Andre Drummond, LLC ^[A]	El Concilio ^[A]
Arc USA Chicago ^[A]	Elevate Nutrition Consulting, LLC ^[A]
Arnold, Jaylen ^[A]	Emily Hutchins ^[A]
Barberet, Cedric ^[A]	Essence Nutrition, LLC ^[A]
Bernath, Steve ^[A]	Estate Five Media, LLC ^[A]
Bluetext, LLC ^[B]	Feed Me Media ^[A]
Born Just Right, Inc. ^[A]	Feeding America ^[P]
Boss Alert Entertainment, LLC ^[A]	Finance Service Group, LLC ^[A]
Brier, Michele V. ^[B]	Flexin' In My Complexion, Inc. ^[A]
Campbell Ewald ^[A]	Food for Thought Consulting, Inc. ^[K]
Casano, Ella ^[A]	Foodtalk Nutrition, LLC ^[A]
Celebexperts, LLC ^[A]	Forever Wealthy ^[A]
Chef Alli's Inc. ^[A]	G & G Nutrition ^[A]
Claudette Aimee Wilkins ^[A]	Gail Golden Consulting, LLC ^[B]
CMGRP, Inc. d/b/a Weber Shandwick ^[A]	Gallegos United ^[A]
Coastal Brand Management, LLC ^[A]	General Mills, Inc. ^[P]
Command Entertainment Group, Inc. ^[A]	Green, Tiffany ^[A]
Common Ground Culinary ^[A]	GuMel Media Agency ^[A]
Competitor Group, Inc. ^[A]	Hamaguchi, Carly ^[A]
Cool Mom Picks ^[A]	Hawk, Tony ^[A]
Cozy Lifestyle, Inc ^[A]	Healthier Eats, LLC ^[A]
Crafty Chica, LLC ^[A]	Hickman, Ryan ^[A]
Crazy Cool Media, LLC ^[A]	Hurtado, Eliana Tardio ^[A]
Crème de la Crumb, LLC ^[A]	Information Resources, Inc. ^[B]
Dairy Management Inc. ^[P]	Inmar Brand Solutions ^[A]
Dick Vitale, Inc. ^[A]	InTech Integrated Marketing Services ^[B]
DoExtra CRM Solutions, LLC ^[B]	International Dairy Foods Association ^[B]
Domestikatedlife, LLC ^[A]	Interpublic Group of Companies, Inc. ^[A]
Dr. Sheryl Zeigler, LLC ^[A]	Isabel Eats, LLC ^[A]
Dude Perfect, LLC ^[A]	Jaimes, Melissa ^[A]

Jason Alley ^[A]
Jason Durolo ^[A]
Jaylen Arnold's Challenge ^[A]
Jena Frumes ^[A]
Jiang, Xuechen ^[A]
Kai's Peak, LLC ^[A]
Kasim Hardaway ^[A]
Kolcheff, Nick ^[A]
Lawrence, Alan ^[A]
Life Listened Media ^[A]
Long Haul Management, Inc. ^[A]
Lovely Eats, LLC ^[A]
Lowe & Partners Worldwide, Inc. ^[A]
Lowe Campbell Ewald ^[A]
LW1, dba Aperture Talent ^[A]
Malone, Jamie ^[A]
Mathis, Andrea ^[A]
Maximillian Petty ^[A]
MLA Integrated Marketing Consulting ^[K]
Mole and More, LLC ^[A]
Muy Bueno, LLC ^[A]
Natalie Rizzo ^[A]
Otis, James ^[A]
Parker Talent Management ^[A]
Penner Media, Inc. ^[A]
Pondera Advisors, LLC ^[B]
Portland Health Coaching, LLC ^[A]
Prime Consulting Group ^[A]
Pritchard, Norah ^[A]
Protagonist, LLC ^[K]
Rachel Paul Nutrition, LLC ^[A]
Radius Global Market Research ^[K]
Raffin, James ^[A]
Red Spark Consulting, LLC ^[A]
Rinny Runs Endurance Sports, Inc. ^[A]
Rizzo, Natalie ^[A]
Roberts, Hannah ^[A]
Rubin, Ronald ^[B]
Sanchez, Ericka ^[A]
SCA Promotions ^[A]
Shepard Kramer ^[A]
Snyder-Cohn, PC ^[B]
SociedAD ^[A]
Songfluencer, LLC ^[A]
Spectrum Group Productions, Inc. ^[B]
St Louis Baking and Pastry ^[A]
Summer Shores ^[A]
Surrency Jones Consulting Group, LLC ^[A]
Sweetportfolio Company Inc ^[A]
Talent Resources ^[A]
Talent Unlimited, LLC ^[A]
The Colony Group, LLC ^[B]
The Heshey Company ^[P]
The Marketing Arm, Inc. ^[A]
The Mom 100 LLC ^[A]
Two Much Entertainment, Inc. ^[A]
United States Olympic Committee ^[P]
United States Swimming, Inc. ^[P]
Viacom International, Inc. ^[A]
Victory Marketing Agency, LLC ^[B]
Villacorta, Manuel ^[A]
Ward, Jennifer ^[A]
Watkinson Miller, PLLC ^[B]
Watson, Eric ^[A]
Woo, Jessica ^[A]
Younger, Katherine ^[A]

National Dairy Foods Research Centers, 2020

Established in 1987, there are six university-affiliated National Dairy Foods Research Centers supported by the National Dairy Council. The mission of the National Dairy Foods Research Centers is to conduct research, educate professionals, transfer knowledge to the industry, and create dairy products and ingredients with improved health, safety, quality, and functionality.

Each Center has a comprehensive array of expertise and resources including dairy pilot plants to accomplish this mission. The centers transfer knowledge to industry by developing future professionals, offering technical assistance, and providing technical training and short courses. Applications labs within the dairy centers assist in concept creation, prototype development, troubleshooting, scale-up, sensory, and consumer evaluation. For additional information, please visit: <https://www.usdairy.com/research-resources/dairy-foods-research-centers>

California Dairy Research Center

- California Polytechnic State University – San Luis Obispo
- David W. Everett, PhD., Center Director
- www.dptc.calpoly.edu

Midwest Dairy Foods Research Center

- University of Minnesota – St. Paul
- Iowa State University – Ames
- South Dakota State University – Brookings
- Lloyd Metzger, PhD., Center Director
- www.midwestdairy.umm.edu

Northeast Dairy Foods Research Center

- Cornell University
- David M. Barbano, PhD., Center Director
- www.foodscience.cals.cornell.edu/cornell-dairy

Southeast Dairy Foods Research Center

- North Carolina State University
- MaryAnn Drake, PhD., Center Director
- www.sdfrc.ncsu.edu

Western Dairy Center

- Utah State University – Logan
- Donald J. McMahon, PhD., Center Director
- www.westerndairycenter.usu.edu

Wisconsin Center for Dairy Research

- University of Wisconsin – Madison
- John Lucey, PhD., Center Director
- www.wisc.edu

Approved Nutrition Competitive Research Activities, 2020

Principal Investigator, Institution, Project Title, and Status

Connie W. Bales, PhD, RD (Duke University Medical Center): *An Enhanced Protein (Dairy) Weight Loss Intervention for Dynapenic Obesity: Impact on Muscle Quality and Composition – Additional Experiments* [ongoing 2020].

Daniela Barile, PhD (University of California-Davis): *Whey Phospholipid Concentrate as a Source of Bioactive Compounds that Improve Human Health* [commenced 2020].

Christopher Blesso, PhD (University of Connecticut): *Milk Phospholipids for the Prevention of Atherosclerosis* [concluded 2020]

Bradley Bolling, PhD (University of Wisconsin-Madison): *Anti-Inflammatory Activity of Yogurt Mediated by The Intestinal Barrier* [ongoing 2020].

Richard Bruno, PhD (Ohio State University): *Alleviation of Metabolic Endotoxemia in Adults with Metabolic Syndrome with Milk Fat Globule Membrane* [concluded 2020].

Nicholas Burd, PhD (University of Illinois at Urbana - Champaign): *Dairy Food Consumption and its Effects on Inflammation and the Postprandial Regulation of Muscle Protein Synthesis* [ongoing 2020].

In-Young Choi, PhD (University of Kansas Medical Center): *Dairy Intake and Cerebral Antioxidant Defense in Aging: A Dietary Intervention Study* [ongoing 2020].

David Clark, PhD (Bovina Mountain Consulting): *Review and Prepare Summary Papers on the Influence of Dairy Consumption on Child (12-60 Months) with Maternal Nutrition* [ongoing 2020].

Sharon Donovan, PhD, RD & Barbara Fiese, PhD (University of Illinois at Urbana - Champaign): *STRONG Kids 2: A Cells-to-Society Approach to Nutrition in Early Childhood* [ongoing 2020].

Rajavel Elango, PhD (The University of British Columbia, School of Population and Public Health (co-funding with Dairy Farmers of Canada)): *Dietary Protein Quality Assessment of Milk in School-Age Children to Meet the Nutritional Need for the Most Limiting Amino Acid, Lysine, when Combined with Cereals* [concluded 2020].

Foundation for the National Institutes of Health: *The Performance of Novel Cardiac Biomarkers in the General U.S. Population* [ongoing 2020].

Darcy Freedman, PhD, MPH (Case Western University): *Modeling the Future of Food in Your Neighborhood Study* [ongoing 2020].

Osama Hamdy, MD, PhD, FACE (Joslin Diabetes Center): *Dairy and Type 2 Diabetes: Research, Outreach, and Education* [ongoing 2020].

Andrea R. Josse, PhD (York University): *Assessing Diet Quality and the Use of Dairy Foods in Meals and Snacks During and After a Lifestyle Modification Intervention in Overweight and Obese Adolescent Girls* [ongoing 2020].

Naiman A. Khan, PhD, RD (University of Illinois at Urbana - Champaign): *Cross-Sectional and Longitudinal Predictors of Cognitive Control and Early Academic Abilities among Preschool Children* [ongoing 2020].

Jana Kraft, PhD (University of Vermont): *Full-Fat Yogurt and Glucose Tolerance* [ongoing 2020]; *Dairy Fat Consumption and the Risk of Metabolic Syndrome: An Examination of the Unique Fatty Acids in Dairy. Narrative Review* [concluded 2020].

Kevin C. Maki, PhD (Midwest Biomedical Research, a division of MB Clinical Research & Consulting): *Scientific Literature Review on the Naturally Occurring Hormone Contents of Foods* [ongoing 2020].

Andrew Mente PhD, MA ((McMaster University (co-funding with Dairy Farmers of Canada))): *Dairy Consumption and Cardiovascular Disease in Diverse Populations* [ongoing 2020].

Daniel Moore, PhD (University of Toronto): *Anabolic Potential of Dairy and Dairy Products for Active Children and Adolescents* [ongoing 2020].

Lynn L. Moore, D.Sc., MPH (Boston University School of Medicine): *Cardiometabolic Effects of Butter and Other Fats and Oils in Framingham Offspring Study Adults* [ongoing 2020]; *Yogurt and Total Dairy Intake Among Women: Effects on Weight Change and Fracture Risk During Critical Life Stages* [ongoing 2020].

Paul Moughan, PhD (Massey University (New Zealand)): *Determination of True Ileal Amino Acid Digestibility in Dietary Protein Sources Commonly Consumed by Humans: Toward an International Database of the Protein Quality of Human Foods* [concluded 2020].

Yanni Papanikolaou, PhD (Nutritional Strategies, Inc.): *Dairy Food Consumption and Association with Mortality Risk* [ongoing 2020]; *Animal Protein Intake and Association with Mortality Risk* [ongoing 2020].

Pamela Pehrsson, PhD (USDA-Agricultural Research Service): *Estimating the Nutritive Value of Fluid Cow's Milk in the U.S.* [ongoing 2020].

Stuart Phillips, PhD (McMaster University): *The Mechanistic Underpinning of Protein Quality and Quantity in Aging Skeletal Muscle: A High Sensitivity Proteome Profiling Approach* [ongoing 2020].

Shivani Sahni, PhD (Harvard University, Hebrew Rehabilitation Center): *Dairy Food Intake, Vitamin D Status and Bone Measures* [ongoing 2020].

Jeffery Schwimmer, MD (University of California, San Diego): *In Children with Obesity, the Intake of Dairy-Derived Odd Chain and Branched Chain Fatty Acids is Inversely Associated with the Risk for Nonalcoholic Fatty Liver Disease* [ongoing 2020].

Lyn Steffen, PhD, MPH, RD (University of Minnesota): *Dairy Consumption, Dietary Patterns and Cardiac Phenotypes* [ongoing 2020].

Elena Volpi, MD, PhD (University of Texas Medical Branch at Galveston): *A Phase I Randomized Clinical Trial of In-Hospital and Post-Hospital Whey Protein vs. Isonitrogenous Collagen Protein vs. Isocaloric Placebo Maltodextrin Supplementation to Improve Recovery from Hospitalization for an Acute Medical Illness in Previously Independent Community Dwelling Older Adults* [ongoing 2020].

Taylor Wallace, PhD, CFS, FACN (Think Healthy Group Inc., and George Mason University): *Dairy Consumption Across Menopause Transition into Later Life – Impact on Bone Mineral Density and Risk of Fractures in Women Enrolled in the SWAN Cohort* [concluded 2020].

Gareth Wallis, PhD (University of Birmingham (United Kingdom)): *Exploring Novel Uses for Lactose Constituents in Sports Nutrition* [concluded 2020].

Approved Product Competitive Research Projects, 2020

Principal Investigator, Institution, Project Title, and Status

Alirez Abbaspourrad, PhD (Cornell University): *Annatto-Free Cheddar Cheese Whey Powder: Enzymatically Triggered Microcapsules as a Novel Method to Partition Color to Cheddar Cheese and Obtain White Whey Powder* [ongoing 2020]; *Novel Approaches to Encapsulate Live and Active Cultures to Extend their Shelf Life in Low Acid Beverages and Allow for Non-Refrigerated Storage* [commenced 2020]; *Chemoenzymatic Synthesis of some of the Human Milk Oligosaccharides (HMOs)* [commenced 2020]; *Designing New Ion Exchange Resins Targeting Lactoferrin Recovery From Sweet Whey* [commenced 2020]; *Improvement Of Lactoferrin Thermal Stability and Functionality by Complex Coacervation and Encapsulation* [commenced 2020]; *Conversion of Lactose to Surfactants* [commenced 2020].

Jennifer Acuff, PhD (University of Arkansas): *Determination of Thermal Inactivation Kinetics of Salmonella and a Surrogate in Dairy Powders* [commenced 2020].

Samuel Alcaine, PhD (Cornell University): *Evaluation of Protective Bacterial Cultures for the Effective Control of Listeria in High-Risk Cheese* [concluded 2020]; *Create Nationwide Food Safety Resources and Provide Support for Artisan/Farmstead Dairy Producers* [ongoing 2020].

Jayendra K. Amamcharla, PhD (Kansas State University): *Development, Characterization, and Evaluation of Modified Milk Protein Concentrate with Enhanced Functional Properties* [ongoing 2020]; *Tailoring Protein Interactions to Influence Functional Properties of Milk Protein Concentrate Powders* [commenced 2020].

Sanjeev Anand, PhD (South Dakota State University): *To Identify Quorum Inhibitor Based Anti-Biofilm Molecules for Developing New Generation Membrane-Biofilm Cleaners for the Dairy Industry* [ongoing 2020].

David J. Baumler, PhD (University of Minnesota): *Evaluation of Intense Pulsed Light Technologies for Non-Thermal Processing to Kill Bacterial Spores in Dry Milk Powders* [ongoing 2020].

Andreia Bianchini, PhD (University of Nebraska): *Application of Interventions at Farm Level to Reduce Sporeformer Bacteria* [ongoing 2020].

Robert Dando, PhD (Cornell University): *Eliminating Photosensitive Absorption Bands from LED Light Engines to Preserve Dairy Quality* [concluded 2020].

MaryAnne Drake, PhD (North Carolina State University): *Southeast Dairy Center Application Laboratory Program* [ongoing 2020]; *Consumer Perception Of Sustainability and its Relation to Labeling Dairy Foods and Ingredients* [concluded 2020]; *MCC Purity and Functionality for Ingredient Applications* [ongoing 2020]; *Comparison of the Efficiency of Ceramic and Polymetric Microfiltration Removal of Whey Protein from Sweet Whey* [concluded 2020]; *The Impact of Dairy Protein Fraction on the Physical and Sensory Properties of High Protein, Low Fat Vanilla Ice Cream* [concluded 2020]; *Determination Of Child Preferences for Milkfat in*

Milk [concluded 2020]; *Dairy Foods that are Calming/Immune Boosting and Identification of Consumer-Centric Messaging for these Products* [commenced 2020]; *Identification of Sources of Undesirable Flavors in Aseptic Milk* [commenced 2020]; *Sugar Reduction in School Lunch Chocolate Milk* [commenced 2020].

David W. Everett, PhD (California Polytechnic State University – San Luis Obispo): *California Dairy Center Application Laboratory Program* [ongoing 2020]; *Improving the Flavor of Cheese Made from Powdered Milk Using Buttermilk* [ongoing 2020].

Kathleen Glass, PhD (University of Wisconsin-Madison): *Mapping the Development of D- and Z-Values for L. Monocytogenes and Escherichia Coli O157:H7 In Cheese Milk to Reduce Pathogen Risks in Cheese Manufacture* [ongoing 2020].

Julie Goddard, PhD (Cornell University): *Mining Value Added, Naturally Derived, Sweeteners from Dairy Co-Product Streams* [ongoing 2020].

Selvarani Govindasamy-Lucey, PhD (University of Wisconsin-Madison): *Innovative Powders and Cheesemaking Processes for the Overseas Manufacture of Recombined Cheeses* [ongoing 2020]; *Shelf-Stable Snacks Made by Extrusion of Natural Cheeses* [commenced 2020].

Federico Harte, PhD (Pennsylvania State University): *Prototype to Study the Effect of Ionic Environments on Casein Micelle Integrity* [ongoing 2020]; *Effects of Calcium Chelation and Alteration of Serum Composition on Low Temperature Gelation of Concentrated Milk Protein Solutions* [ongoing 2020]; *Transforming High Pressure Jet (HPJ) Processing into a Commercially Viable Technology for the Dairy Industry* [commenced 2020].

Richard Hartel, PhD (University of Wisconsin-Madison): *Application of Select Dairy Ingredients to Enhance Shelf Life, Physical Properties and Sensory Attributes of High Protein Frozen Dairy Desserts* [commenced 2020].

Tu-Anh Hyunh, PhD (University of Wisconsin-Madison): *A Novel GRAS Natural Antimicrobial to Control Listeria in the Dairy Processing Environment* [ongoing 2020]; *Inhibition of Listeria Monocytogenes on Wooden Cheese Board Microbiota* [commenced 2020].

Mark Johnson, PhD (University of Wisconsin-Madison): *Innovative Approaches to Increase the Shelf Life of String Cheese and Fresh Cheese Curds* [ongoing 2020].

Helen Joyner, PhD (University of Idaho): *Enhancing the Functionality of Milk Protein Concentrate through Direct Steam Injection Cooking* [Ongoing 2020]; *Creating Cleaner Label Process Cheese Foods by Replacing Emulsifying Salts with Dairy Proteins* [ongoing 2020].

Larry Kenney, PhD (Pennsylvania State University): *Characterization of the Effects of a Sports Drink Containing Milk Permeate on Hydration Status in Healthy Young Subjects* [commenced 2020].

John A. Lucey, PhD (University of Wisconsin-Madison): *Wisconsin Center for Dairy Research Applications Laboratory* [ongoing 2020]; *Impact of Microfiltration Retentates on Cheese Quality* [ongoing 2020]; *New Membrane Technology to Make High-Value Dairy Ingredients* [ongoing

2020]; *Novel Ceramic Nanofiltration to Improve Coproduct Quality and Increase Utilization* [ongoing 2020].

Curtis Lockett, PhD (University of Tennessee): *Preference Mapping of the Chinese Cheese Market* [ongoing 2020].

Sergio Martinez-Monteagudo, PhD (South Dakota State University): *Development of A Two-Step Process for The Production of Food Ingredients from Whey Permeate* [ongoing 2020]; *Effective Phospholipids Extraction from Dairy Byproducts using Switchable Solvents* [ongoing 2020].

Owen M. McDougal, PhD (Boise State University): *Cost Effective Dairy Protein Certification Method* [commenced 2020].

Melha Mellata, PhD (Iowa State University): *Controlling Listeria monocytogenes in Fresh Cheeses with High Voltage Atmospheric Cold Plasma (HVACP) Treatment - Phase II* [ongoing 2020].

Lloyd Metzger, PhD (South Dakota State University): *Midwest Dairy Foods Applications Laboratories Program* [ongoing 2020]; *Manufacture of Ingredients for use in Clean Label Process Cheese and Recombined Cheese in Export Markets* [commenced 2020].

Carmen I. Moraru, PhD (Cornell University): *Cheese Snack Products: Consumer Trends and a Novel Manufacturing Approach Using Vacuum Microwave Drying Technology* [commenced 2020].

Mary Murphy, PhD (Exponent, Inc.): *Nutrient Adequacy and Markers for Gestational Health Among Pregnant Women in the United States and Associations with Diet Quality and Dairy Consumption* [ongoing 2020].

Daniel Noguera, PhD (University of Wisconsin-Madison): *Microbial Production of Value-Added Constituents from Lactose-Rich Dairy Coproducts* [ongoing 2020].

NIZO Food Research B.V. (Netherlands): *Reduction of Spore Count in Milk Powder Production - Phase II of Development of An Improved Enumeration Method for Highly Heat Resistant Spores* [ongoing 2020].

Scott A. Rankin, PhD (University of Wisconsin-Madison): *Production of Lactose-Free Dairy Products by the Catalytic Hydrolysis of Lactose in Dairy Streams with Solid Acid Catalysts* [ongoing 2020].

Dojin Ryu, PhD (University of Idaho): *Enhancing the Functionality of Milk Protein Concentrate Through Direct Steam Injection Cooking* [commenced 2020].

Tonya Schoenfuss, PhD (University of Minnesota): *Improvement of Processing and Functional Properties of Milk Protein Concentrate and Micellar Casein by Pulsed Electric Field Pre-Treatment* [ongoing 2020].

Jeyamkondan Subbiah (University of Nebraska – Lincoln): *Microbial Inactivation Kinetics of Salmonella Spp. in Dairy Powders* [ongoing 2020].

Ruihong Zhang, PhD (University of California-Davis): *A Novel Integrated System for Polyhydroxyalkanoates (PHA) Production from Cheese Production Byproducts* [commenced 2020].

Qixin Zhong, PhD (University of Tennessee): *Improving Functionalities of Spray-Dried Skim Milk Powder by Supplementing Soluble Caseins* [ongoing 2020].

Approved Sustainability Competitive Research Activities, 2020

Principal Investigator, Institution, Project Title, and Status

Olivier Jolliet, PhD (University of Michigan): *Dairy's Nutritional Benefit and Environmental Impact – Phase II* [ongoing 2020].

Catherine Keske, PhD (University of California, Merced): *Economic Analysis of Agronomic use of Dairy Manure to Improve Soil Health* [commenced 2020].

Ermias Kребreab, PhD (University of California - Davis): *Quantitative Assessment for Feed Additives Enteric Methane Mitigation Protocol* [ongoing 2020].

Johannes Lehmann, PhD (Cornell University): *Biochar Education and Outreach for the Dairy Industry* [ongoing 2020].

Keith Paustian, PhD (Colorado State University): *Modeling Environmental Impacts of Synthetic and Dairy-Manure Based Fertilizers in U.S. Dairy Farms* [commenced 2020].

Kristan Reed, PhD (Cornell University): *The Ruminant Farm System Model - Dairy Cow Ration Formulation and Feed Allocation Modules* [ongoing 2020].

Greg Thoma, PhD (University of Arkansas): *Environmental Stewardship – Reporting Platform* [commenced 2020].

Robin White, PhD (Virginia Polytechnic Institute and State University): *Nutritional and Environmental Consequences of Dairy Removal from U.S. Agriculture* [ongoing 2020]; *Supply of Nutrients and Environmental Impacts of Milk Production at Global, Regional, and Country Specific Scales* [concluded 2020].

Melissa Wilson, PhD (University of Minnesota): *Understanding the Relationships Between Dairy Manure and Soil Health to Promote Dairy's Sustainability* [commenced 2020].