



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**

2019 Activities

August 2022

Contact Information

Promotion, Research, and Planning Division

USDA, Agricultural Marketing Service, Dairy Program

Stop, 0233, Room 2958-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 (e.g., Braille, large print, audiotape, 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.

July 2022

Contents

Contact Information	1
Executive Summary	6
Chapter 1: The Dairy and Fluid Milk Promotion Programs	8
Chapter 2: USDA Activities	14
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	19
Chapter 4: Qualified State, Regional, or Importer Dairy Product Promotion, Research, or Nutrition Education Programs	52
Additional Information: 2019 Approved Contracts, National Dairy Foods Research Centers, Research Activities, and Audits	60

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, 2019, 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 \$344.1 million in 2019. The Dairy Board portion of assessments totaled \$114.7 million, and the Qualified Dairy Product Promotion, Research, or Nutrition Education Programs (QPs) totaled \$229.4 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 human consumption of dairy products by focusing on partnerships and innovation, product positioning with consumers, and new places for dairy product consumption.

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

Fluid Milk Processor Promotion Program

Mandatory assessments collected under the Fluid Milk Act totaled \$83.2 million in 2019. 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 2019 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 - \$3.26; (2) cheese - \$3.62; (3) butter – \$24.40. The BCR for fluid milk processors attributed to fluid milk promotion activities is \$3.28.

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.

I. 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 one of 12 geographic regions within the United States, and one 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 three-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 Dairy Board's administrative budget continued to be within the five-percent-of-revenue limit required by the Dairy Order. An independent auditor's report for 2019 can be found in the Additional Information section of this report.

The Dairy Board has two standing committees: the Finance Committee and the Executive Committee. The Finance Committee is chaired by the Dairy Board Treasurer and consists of the Dairy Board officers and appointees named by the Dairy Board Chair. 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 19 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 (45) 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 2019, DMI continued to implement a national staffing structure to plan and execute the national programs.

DMI funds one- to three-year research projects supporting marketing efforts. Six Dairy Foods Research Centers and one Nutrition Institute provided much of the research in 2019. 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 four joint program committees: Research and Insights; Health and Wellness; Export and Ingredients; and Producer Relations and Consumer Confidence. 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 2019, the Dairy Board and UDIA Board met jointly six times.

DMI hosted dairy director regional planning forums across the country to review and create marketing strategies for the unified dairy promotion plan in 2019. These forums were designed to create one unified dairy promotion plan and allow opportunities for grassroots dairy producers to ask questions, raise concerns, and offer thoughts on the plan's direction and development.

For more information on the Dairy Board and UDIA Board activities and initiatives implemented in 2019, see the DMI annual report at <https://www.usdairy.com/getmedia/6eb89e24-6334-42cc-8514-621a01eb2a85/2019-Annual-Report-FINAL.pdf?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 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 the other five members are at-large. 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 three-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 occasion-based 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, 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 2019 to conduct board business and once to welcome their new Chief Executive Officer (CEO).

On September 18, 2019, MilkPEP announced the selection of Ms. Yin Woon Rani as their new CEO. Ms. Rani joined MilkPEP after 20 years in the advertising and marketing industry, most recently as the Vice President, Chief Customer Experience Officer for the Campbell Soup Company.

Total Fluid Milk Board income and expenses are displayed in the annual independent financial audit. The Fluid Milk Board's administrative budget continued to be within the five percent-of-revenue limit required by the Fluid Milk Order. An independent auditor's report for 2019 can be found in the Additional Information section of this report.

For more information on the Fluid Milk Board activities and initiatives implemented in 2019, see the Milk PEP annual report at <https://milkpep.org/wp-content/uploads/2020/12/Annual-Report-2019-FINAL.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. The 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, the U.S. Dietary Guidelines for Americans, and other legislation. The AMS Dairy Program also uses the "*Guidelines for AMS Oversight of the Commodity Research and Promotion Programs*" to govern oversight of and facilitate the application of legislative and regulatory provisions of the Acts and 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, public and industry 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 that contracts that expend assessments funds be approved by the Secretary. During 2019, the AMS Dairy Program reviewed and approved 504 Dairy Board and DMI agreements, amendments, and annual plans. During 2019, DMI retained the certified public accounting firm Ernst & Young to audit the records of the following contractors: Daniel J. Edelman, Inc.; sparks & honey, LLC; Darigold, Inc.; Board of Regents of the University of Wisconsin; and Market Makers, Inc. 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 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 with established USDA policies. In 2019, the AMS Dairy Program reviewed and approved 80 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 that have mandatory assessment laws, organic dairy producers are exempt only from the Federal assessment, organic producers are still responsible for the remittance of State assessments. In 2019, the amount of exempted assessments was \$1,672,406. 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 2019, the AMS Dairy Program’s oversight expenses totaled \$791,370, and the Federal Milk Market Administrators incurred \$246,420 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 that are authorized by Federal or State law were active programs prior to the Dairy Act. In 2019, 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 2019 in Chapter 4.

National Fluid Milk Processor Promotion Board Oversight

Program Development

The Fluid Milk Board contracted with Arc USA Chicago 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 that budgets and contracts that expend assessments be approved by the Secretary. During 2019, the AMS Dairy Program approved 113 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 2019 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, 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 2019, the amount of exempted fluid milk assessments was approximately \$2,139,670. 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 2019, the AMS Dairy Program’s oversight expenses totaled \$515,754, and the Federal Milk Market Administrators incurred \$122,406 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 2019

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 2019 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 the equivalent thereof, on dairy products imported into the U.S. 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 19 of the 64 Qualified Programs¹ (QPs) under the direction of a board of directors. DMI's mission is to drive increased

¹ Qualified Dairy Product Promotion, Research or Nutrition Educational Programs (Qualified Programs, or QPs) are

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 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 Milk Processor Education Program (MilkPEP) is the staffing organization that carries out the promotion programs on behalf of the Fluid Milk Processor Promotion Program.

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.

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 conducted actually benefit from them?

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.

Historically, this question has 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. For example, a \$1 investment that returns \$5 in incremental revenue generates a BCR of 5 to 1. However, a 5-to-1 BCR also results from a \$5 million return from a \$1 million investment. Despite resulting in the same BCR, the magnitude of the impact from the \$1 million investment is obviously much greater than that of the \$1 investment. 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 fourfold, namely 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. Update and utilize a previously developed simulation model of the U.S. dairy industry to calculate the quantity and price effects of the National Programs in U.S. fluid milk, cheese,

butter, and all dairy product markets, and on dairy exports; and the BCRs corresponding to promotion in each of those markets for dairy producers and fluid milk processors;

3. Provide a qualitative and quantitative analysis of dairy product imports and import assessments; and
4. Update the benefit-cost analysis of the National Programs.

This project covers the period of 1995 to 2019 and captures the joint efforts of DMI, MilkPEP, and the QPs. The shares of each promotion entity in the total demand-enhancing expenditures over this period are as follows: (1) DMI – 25.79 percent; (2) MilkPEP – 23.64 percent; and (3) QPs – 50.56 percent.

Summary of the Findings

The overall finding of this evaluation is that the dairy promotion under the National Programs have effectively increased U.S. demand (domestic and exports) for dairy products.

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 2019, the BCRs expressed in terms of producer profit at the farm level were calculated to be \$3.26 for every dollar invested in demand-enhancing activities for

fluid milk; \$3.62 for every dollar invested in demand-enhancing activities for cheese; and \$24.40 for every dollar invested in demand-enhancing activities for butter. For other non-specific promotion activities, the BCR was calculated to be \$6.79 for every dollar invested. Over the same period, the BCR of export promotion was \$6.94 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 4.76, meaning that, on average, producer profit increased by \$4.76 for each dollar invested in demand-enhancing activities.

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 2019, averaging \$3.93 million. The import assessment represents approximately 1 percent of the total demand-enhancing expenditures made by DMI, MilkPEP, and the QPs.

Imported cheese levels were higher by 1.4 million pounds due to promotion funds collected from importers. Unit values of cheese imports amounted to roughly \$3.19 per pound on average over the period between 2012 and 2019. Hence, incremental revenue to importers solely from cheese attributable to the import assessment (on cheese) totaled roughly \$4.5 million.

Available expenditure data from DMI and MilkPEP also allows for the calculation of separate BCRs at the farm level for the two groups. The BCR associated with DMI spending was estimated to be 5.59, quite similar to the 4.76 return on investment for all dairy product

promotion investments. The BCR for MilkPEP was estimated to be 3.28, very similar to the 3.26 figure previously reported for all fluid milk promotional spending.

The BCR of fluid milk at the processor level was estimated to be 5.61 over the period 1995 to 2019. 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. 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.

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.

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, the DMI Board of Directors changed their 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 the QPs over the period 1995 to 2019 are depicted in Table 3-1 and Figure 3-1. On average, roughly \$370 million in total were spent annually by the respective entities over this period and approximately between \$400 million and \$415 million since 2013. In 2019, promotion program expenditures amounted to slightly more than \$403 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 only available on an annual basis. To estimate quarterly data for the QPs, the seasonal nature of DMI and MilkPEP expenditure data is assumed to be similar to 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.

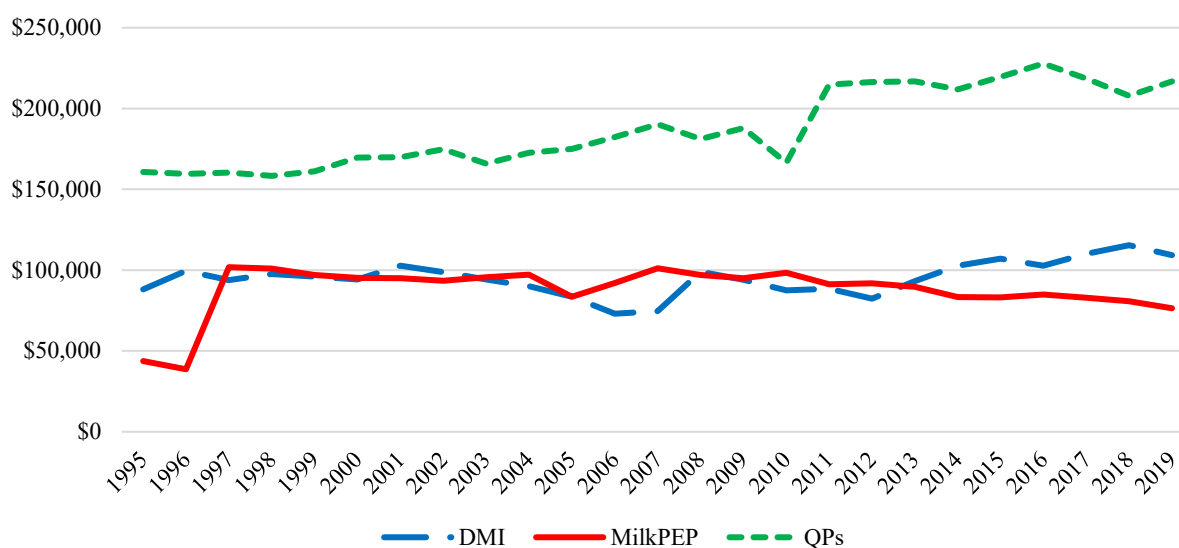
Table 3-1. Annual Dairy Management Inc. (DMI), Milk Processor Education Program (MilkPEP), and Qualified Program (QP) Promotion Program Expenditures, 1995 to 2019¹

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

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 2019



Source: Data from DMI, MilkPEP, and the 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 2019 are exhibited in Figure 3-2. These demand-enhancing expenditures varied from \$53.5 million to \$98.7 million per quarter, averaging \$82.4 million.

Nominal seasonally adjusted demand-enhancing expenditures for fluid milk from DMI, MilkPEP, and QPs on a quarterly basis from 1995 to 2019 are exhibited in Figure 3-3. Over that period, nominal seasonally adjusted quarterly promotion program expenditures for fluid milk ranged from roughly \$22.8 million to \$63.3 million per quarter. On average over the same period, nominal seasonally adjusted demand-enhancing expenditures for fluid milk were \$33.8 million per quarter.

As shown in Figure 3-4, over the period 1995 to 2019, nominal seasonally adjusted demand-enhancing expenditures for cheese averaged \$15.8 million per quarter, ranging from \$8.1 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. On average, expenditures on cheese marketing and promotion were \$12 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 \$8.1 million to \$17.1 million, averaging \$11.7 million per quarter.

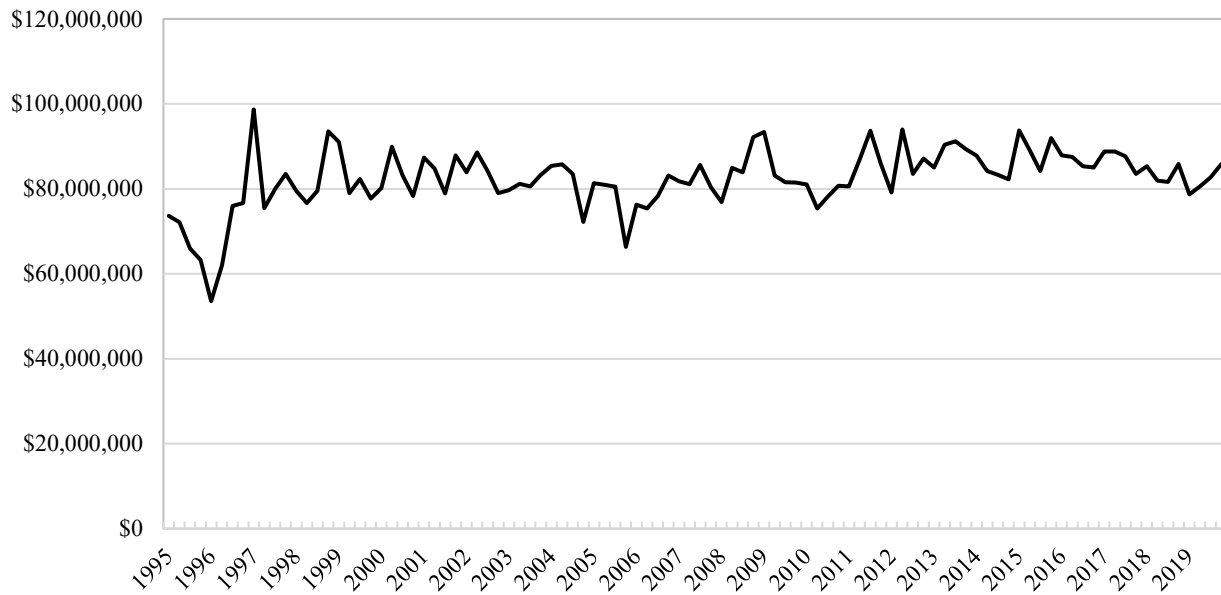
As shown in Figure 3-5, nominal seasonally adjusted demand-enhancing quarterly expenditures on marketing and promotion of butter ranged from close to \$60,000 to \$6.8 million, averaging

slightly more than \$1.3 million per quarter over the period 1995 to 2019. 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 a number of 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.

DMI also invests in dairy export promotion through the U.S. Dairy Export Council (USDEC). Nominal, seasonally adjusted DMI expenditures directed to dairy export promotion on a quarterly basis ranged from just under \$800 to approximately \$6.7 million (Figure 3-6a). These expenditures trended upward from 1995 to 2019, averaging about \$2.8 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 \$310,000 to about \$2.0 million, averaging nearly \$1.1 million per quarter over the period of 1997 to 2019. 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 \$8.7 million per quarter, averaging \$3.8 million on a quarterly basis over the same period from 1995 to 2019 (Figure 3-6c).

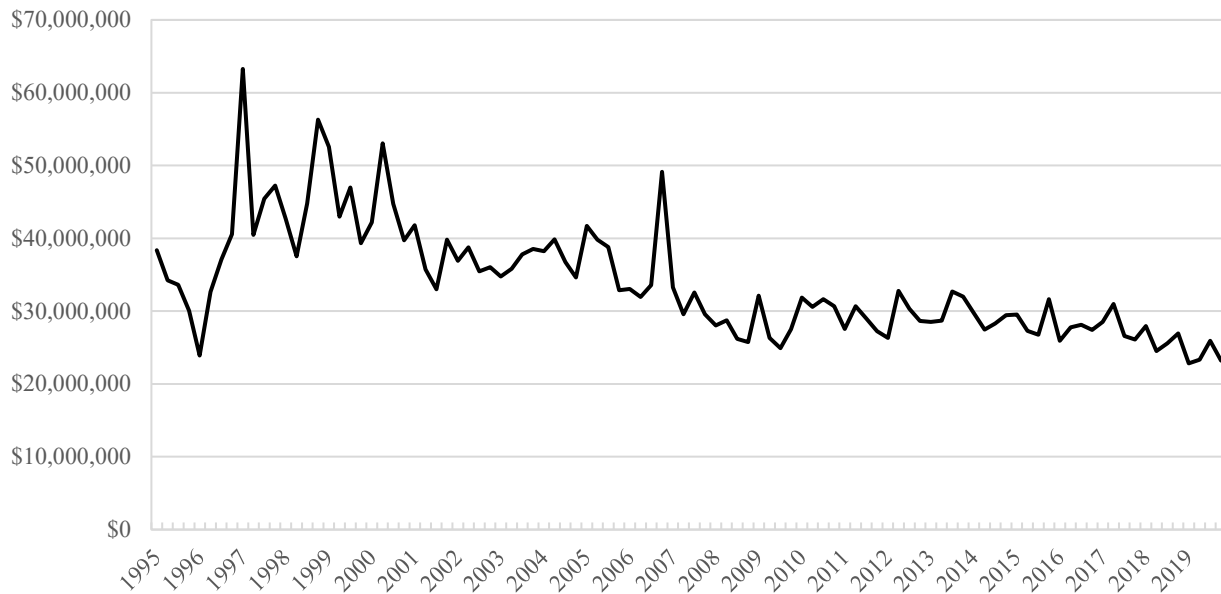
Figure 3-2. Quarterly All Dairy Product Promotion Expenditures (Nominal, Seasonally Adjusted) by Dairy Management Inc. (DMI), Milk Processor Education Program (MilkPEP), and Qualified Programs (QPs), 1995 to 2019*



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

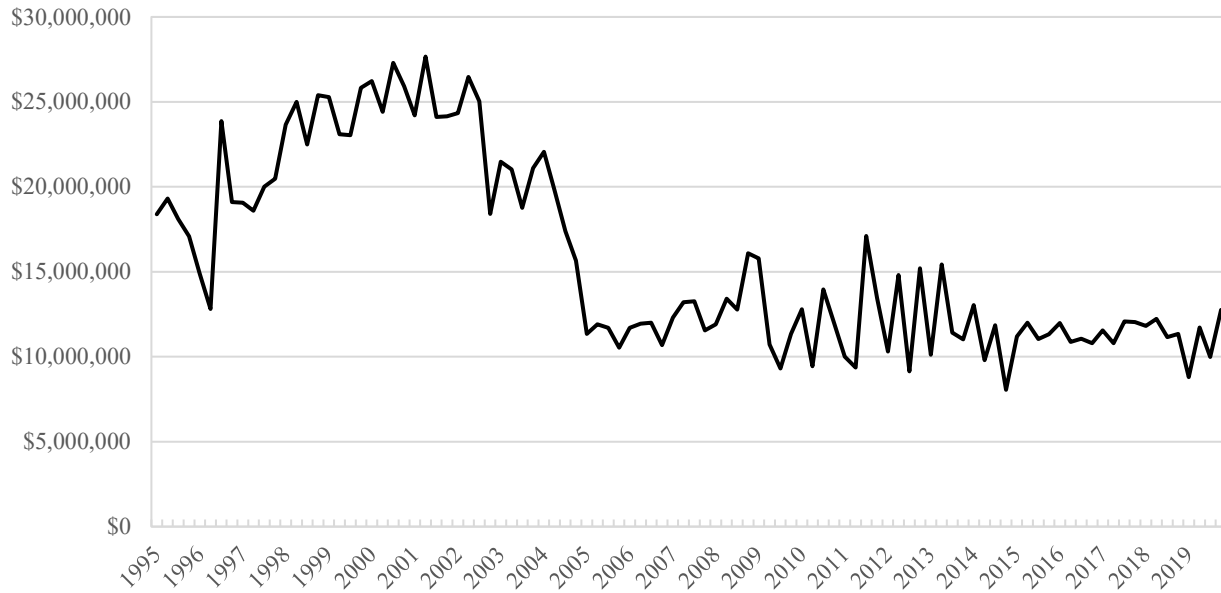
Source: Data from DMI, MilkPEP, and QPs. Calculations by the authors.

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 2019



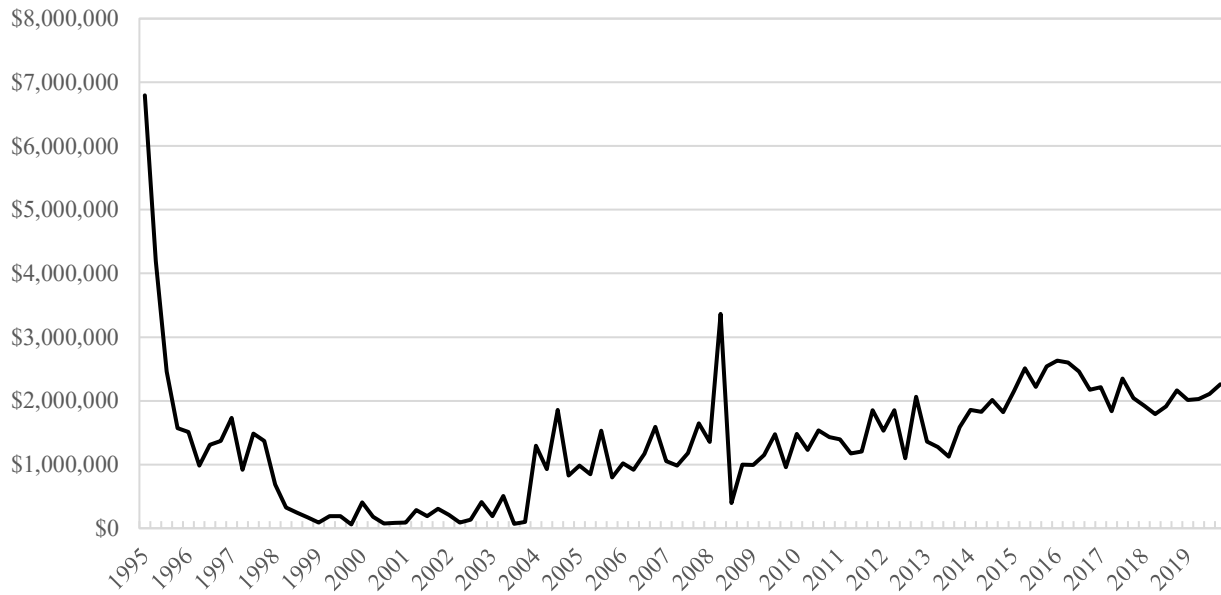
Source: Data from DMI, MilkPEP, and QPs. Calculations by the authors.

Figure 3-4. Quarterly Cheese Promotion Expenditures (Nominal, Seasonally Adjusted) by Dairy Management Inc. (DMI) and Qualified Programs (QPs), 1995 to 2019



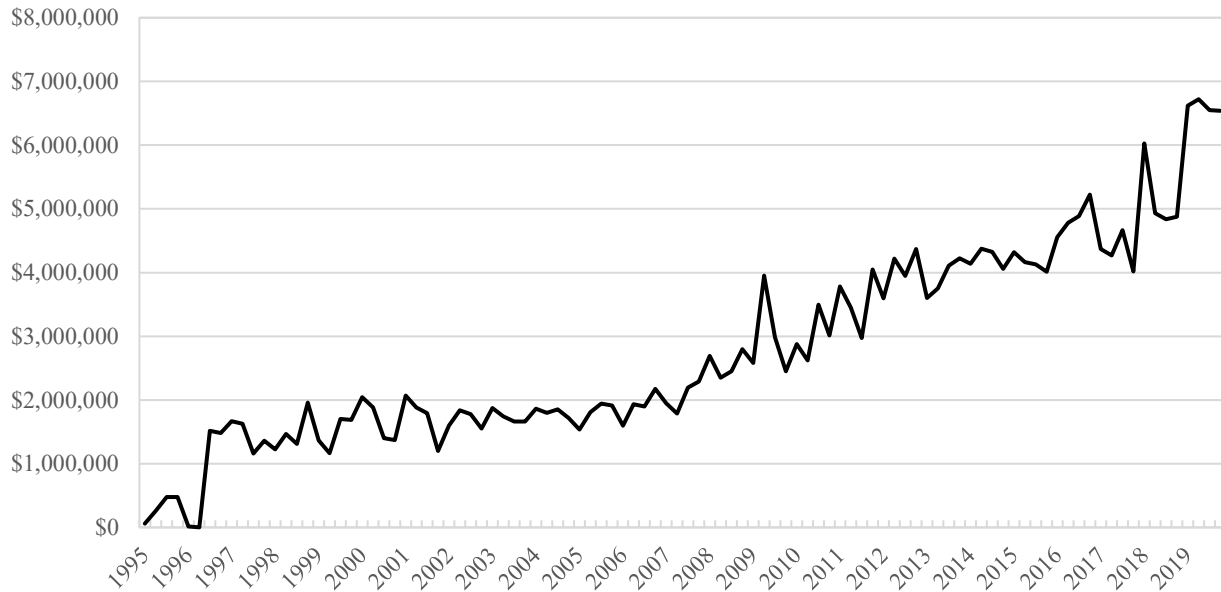
Source: Data from DMI and QPs. Calculations by the authors.

Figure 3-5. Quarterly Butter Demand-Enhancing Expenditures (Nominal, Seasonally Adjusted) by Dairy Management Inc. (DMI) and Qualified Programs (QPs), 1995 to 2019



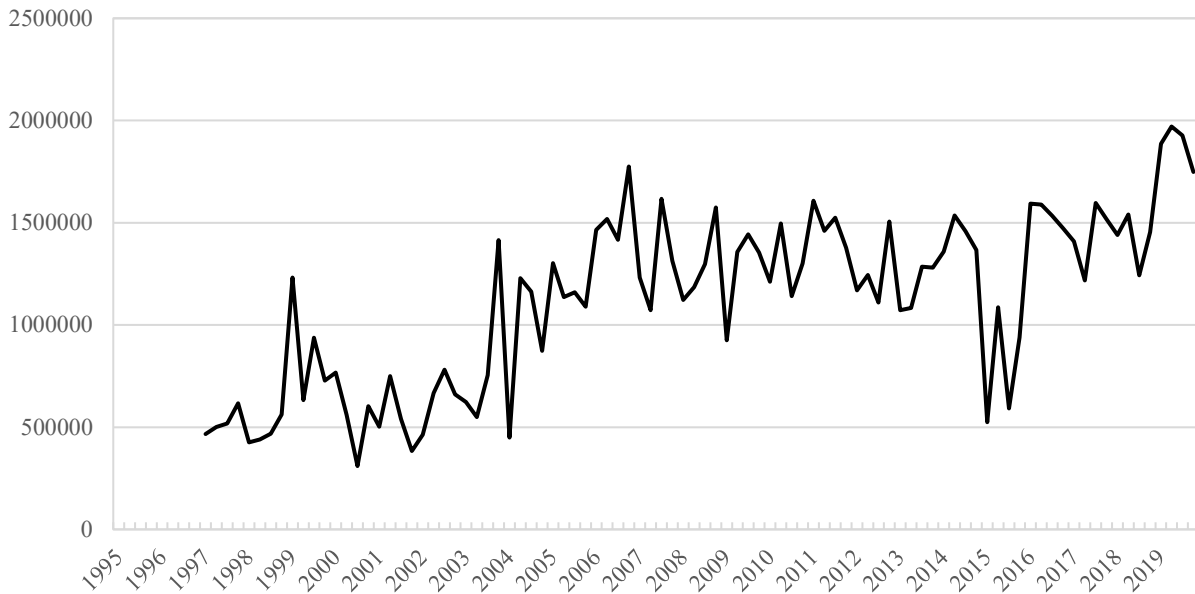
Source: Data from DMI and QPs. Calculations by the authors.

Figure 3-6a. Quarterly Dairy Product Export Expenditures (Nominal, Seasonally Adjusted) by Dairy Management Inc. (DMI), 1995 to 2019



Source: Data from DMI. Calculations by the authors.

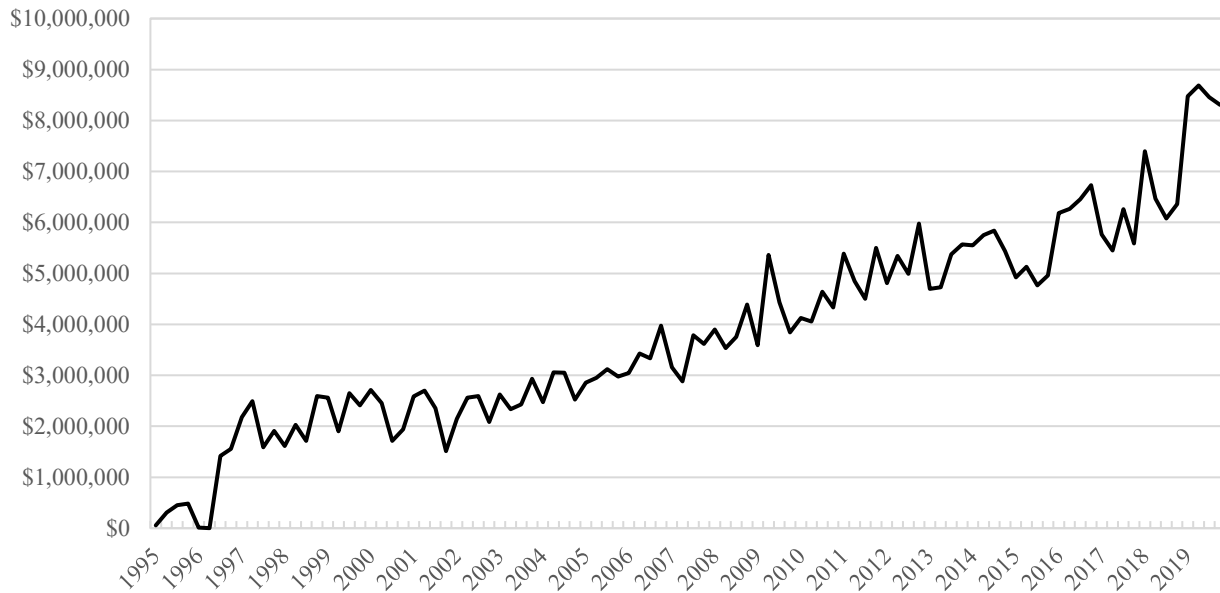
Figure 3-6b. Quarterly Dairy Product Export Expenditures (Nominal, Seasonally Adjusted) through the Foreign Market Development/Market Access Programs, 1997 to 2019*



*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 2019



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).

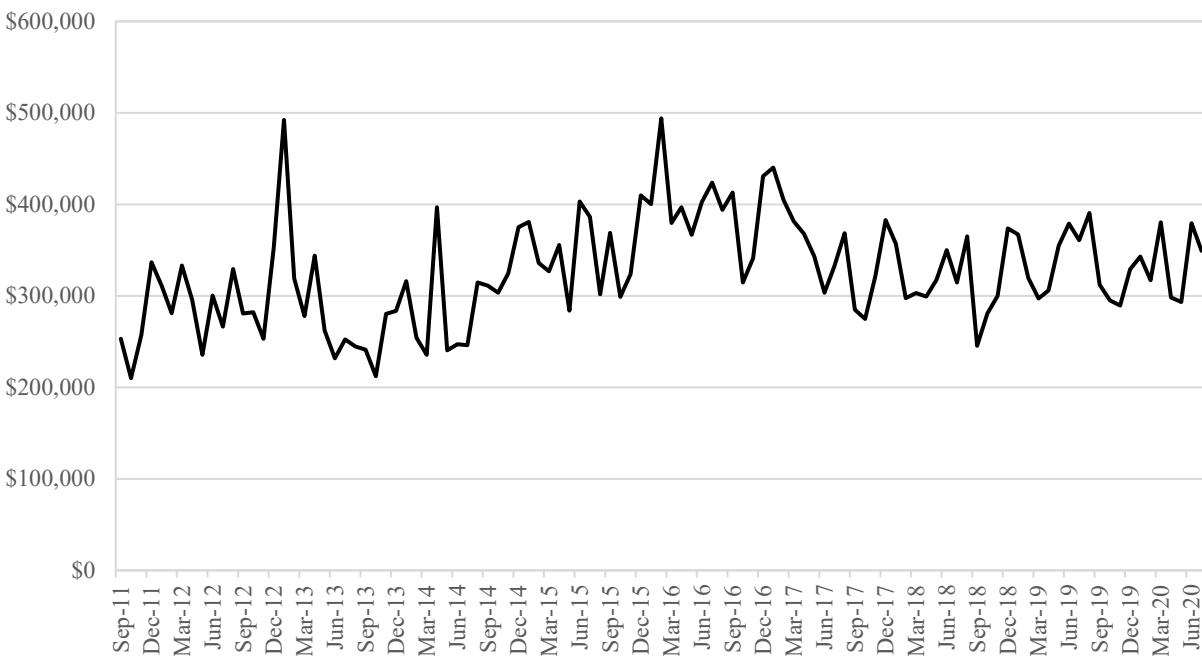
Two thirds of the import assessment are allocated to the National Dairy Board. The remaining amount can be designated to be used by one of three QPs to support dairy promotion: (1) Cheese Importers Association of America; (2) Global Dairy Platform; and (3) the Wisconsin Milk Marketing Board, Inc. Import assessment funds totaled between \$3.44 million and \$4.76 million

per year from 2012 to 2019, averaging \$3.93 million. The cumulative import assessment funds totaled \$32.53 million from September 2011 to December 2019. On a monthly basis, funds from the dairy import assessment ranged from \$210,086 to \$493,975, averaging \$325,271 over the period of September 2011 to December 2019 (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 2019.

Trends in Dairy Use

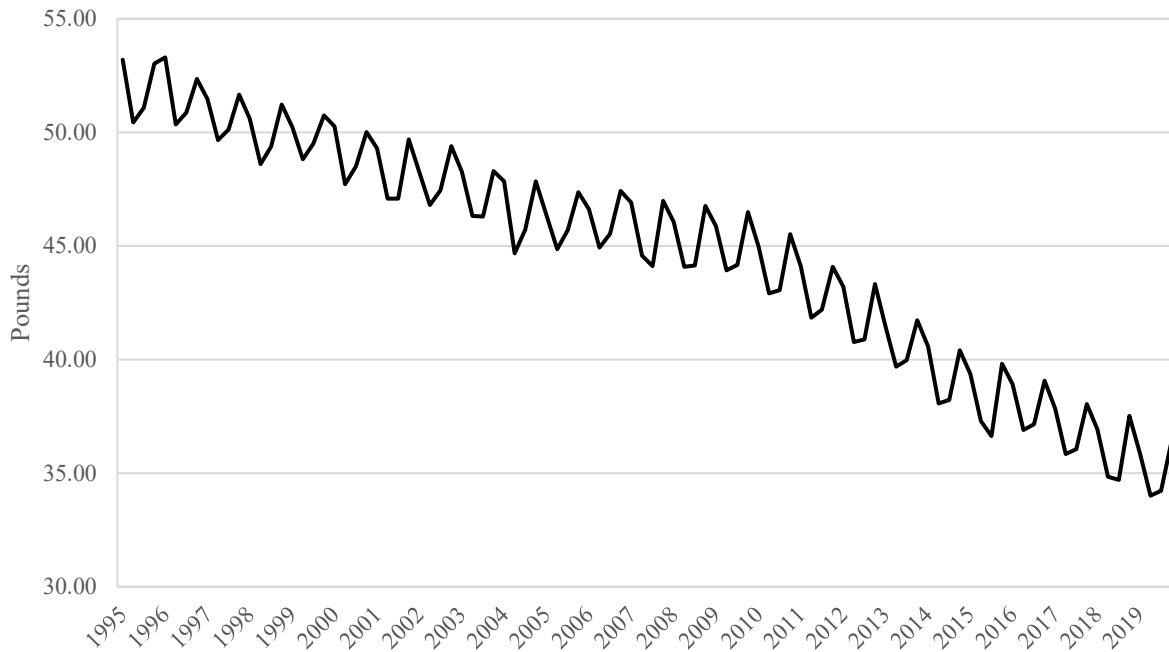
Per capita fluid milk consumption trended downward between 1995 and 2019 (Figure 3-8). In 2019, per capita consumption of fluid milk ranged from 34.01 pounds per person to 36.44 pounds per person, down from 50.44 pounds per person to 53.20 pounds per person in 1995.

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



Source: U.S. Department of Agriculture

Figure 3-8. Quarterly Per Capita U.S. Consumption of Fluid Milk, 1995 to 2019



Source: U.S. Department of Agriculture.

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). The majority of 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. U.S. per capita milk consumption has declined by nearly 33 percent since 1995 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 2019, the commercial per capita disappearance of cheese ranged from 6.4 pounds per quarter to 10.1 pounds per quarter, averaging about 8.1 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 0.9

pounds per quarter to 1.9 pounds per quarter, averaging slightly more than 1.2 pounds.

On average over the period 1995 to 2019, the per capita commercial disappearance of all dairy products on a fat basis amounted to 152 pounds per quarter, ranging from 137 pounds to 172 pounds per quarter (Figure 3-11). On a skim-solids basis, the per capita commercial disappearance of all dairy products over that same period amounted to 137 pounds per quarter, ranging from 130 pounds to 143 pounds per quarter (Figure 3-12).

Between 1995 and 2019, quarterly dairy exports on a fat basis averaged nearly 1,381 pounds and close to 5,700 pounds on a skim-solids basis (Figure 3-13).

The United States imported between \$2.8 billion and \$3.5 billion in dairy products from 2012 to 2019 (Table 3-2). Cheese products accounted for 35.73 percent to 43.43 percent (by value) of all dairy imports (Figure 3-14). Cheese imports as a percent of total dairy imports were highest in 2018 at 43.43 percent and lowest in 2012 at 35.73 percent.

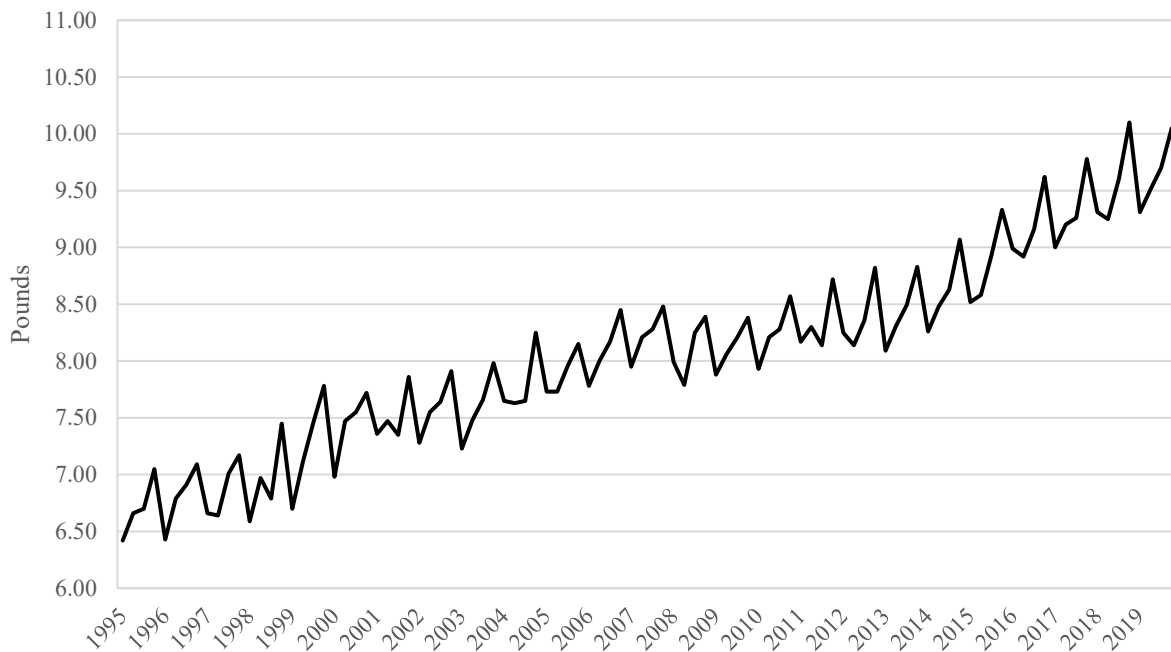
The analysis in the next section addresses the response of consumers to dairy promotion expenditures. Structural econometric models were developed to isolate the effects of those expenditures on demand for dairy products from those of other fundamental economic forces such as price and income.

Findings on Impacts of Promotion Expenditures on Dairy Demand

The primary objective of the analysis is to answer two key questions regarding the National

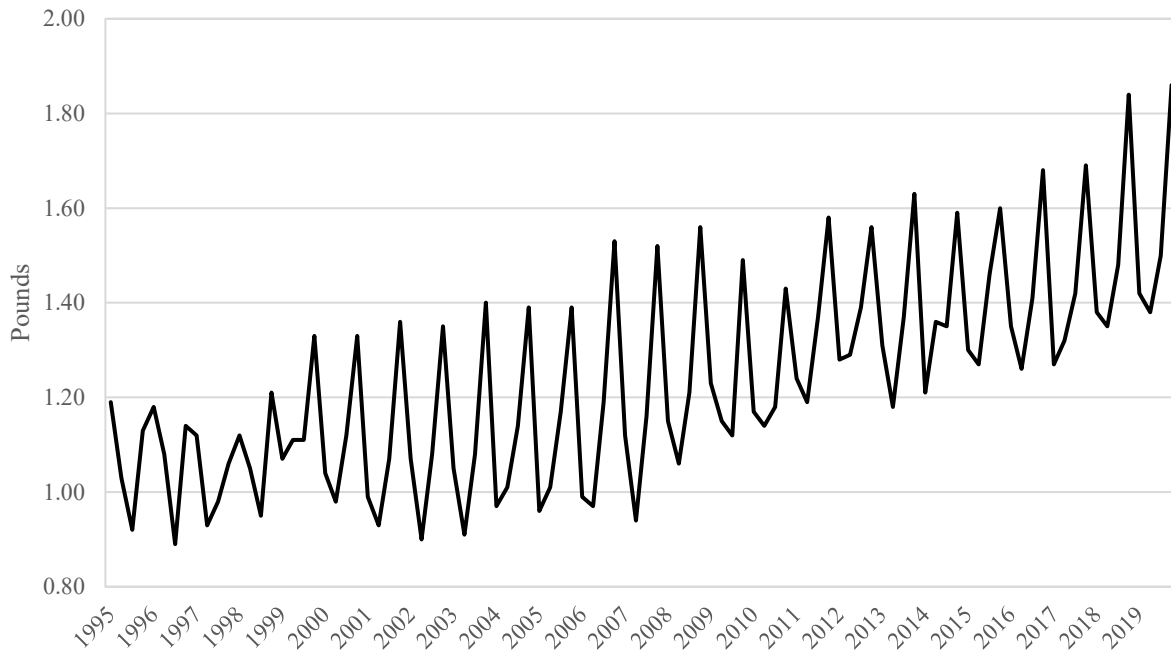
Programs over time: (1) What have been the effects of dairy promotion programs on the domestic consumption of fluid milk, dairy products, and exports?; and (2) What have been the returns to dairy promotion programs? In answering the first question, the focus is on the effects of the dairy promotion program 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 to producers.

Figure 3-9. Quarterly Per Capita U.S. Consumption of Cheese, 1995 to 2019



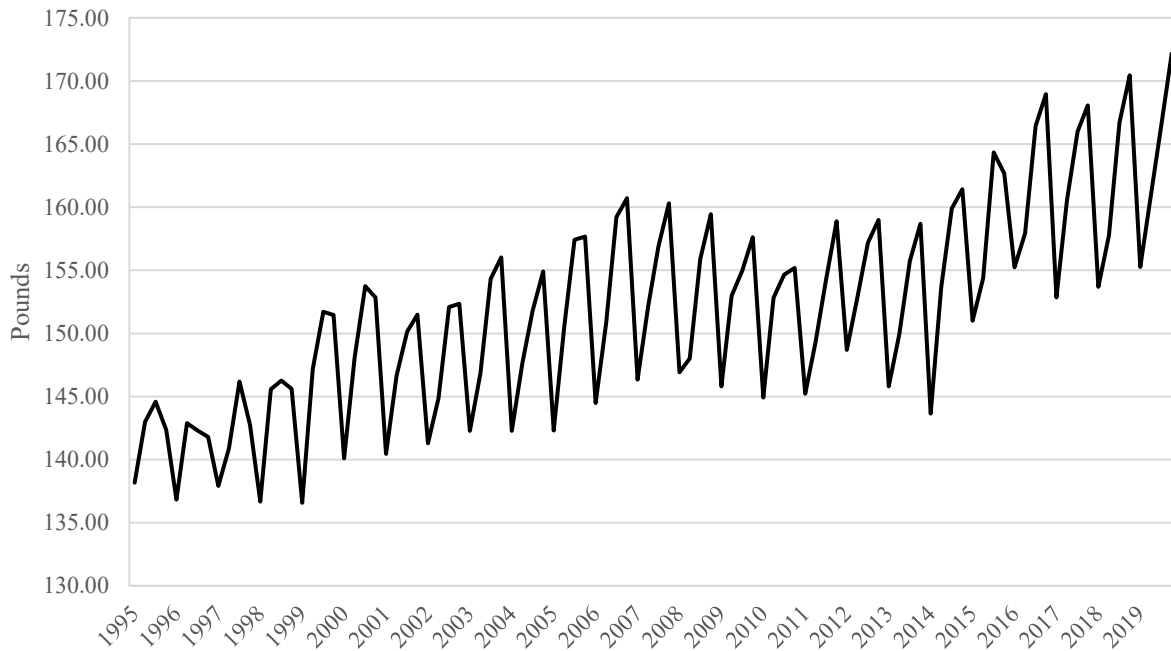
Source: U.S. Department of Agriculture.

Figure 3-10. Quarterly Per Capita U.S. Consumption of Butter, 1995 to 2019



Source: U.S. Department of Agriculture.

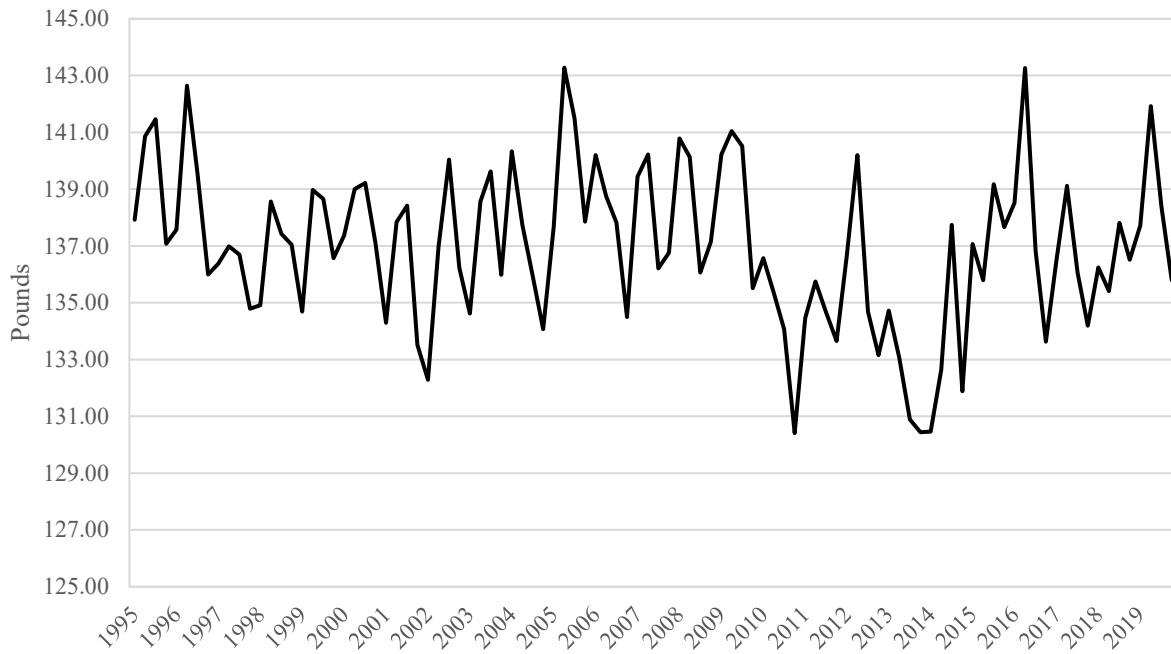
Figure 3-11. Quarterly Per Capita U.S. Consumption of All Dairy Products on a Milk-Equivalent Fat Basis, 1995 to 2019



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

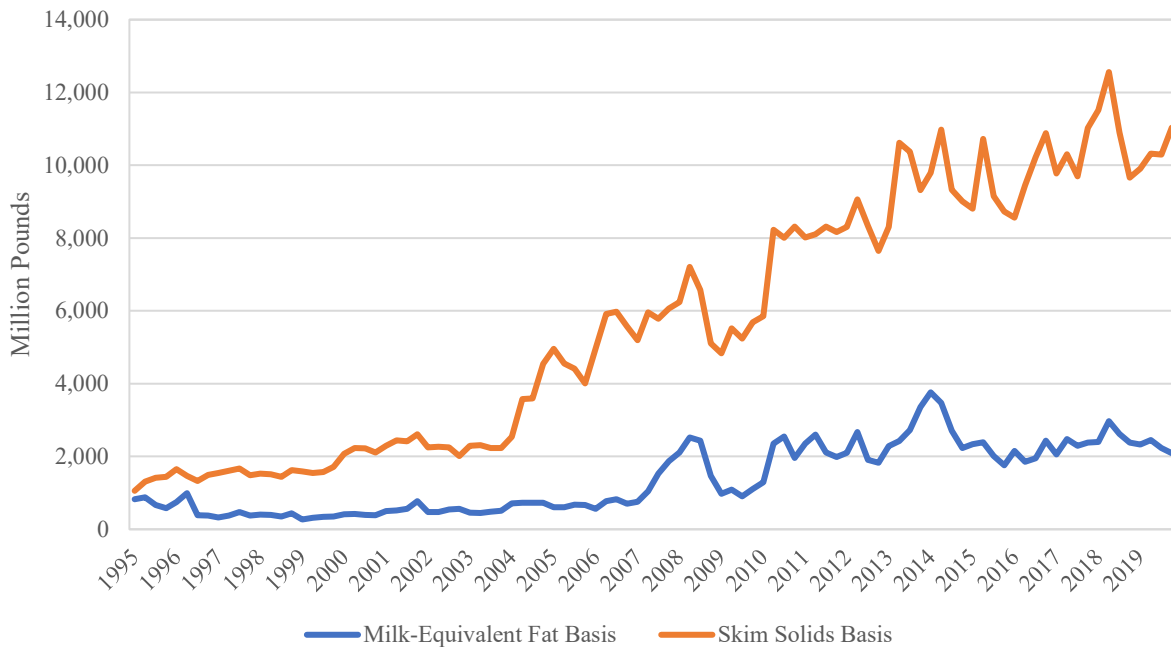
Figure 3-12. Quarterly Per Capita U.S. Consumption of All Dairy Products on a Skim-Solids

Basis, 1995 to 2019



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 2019



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

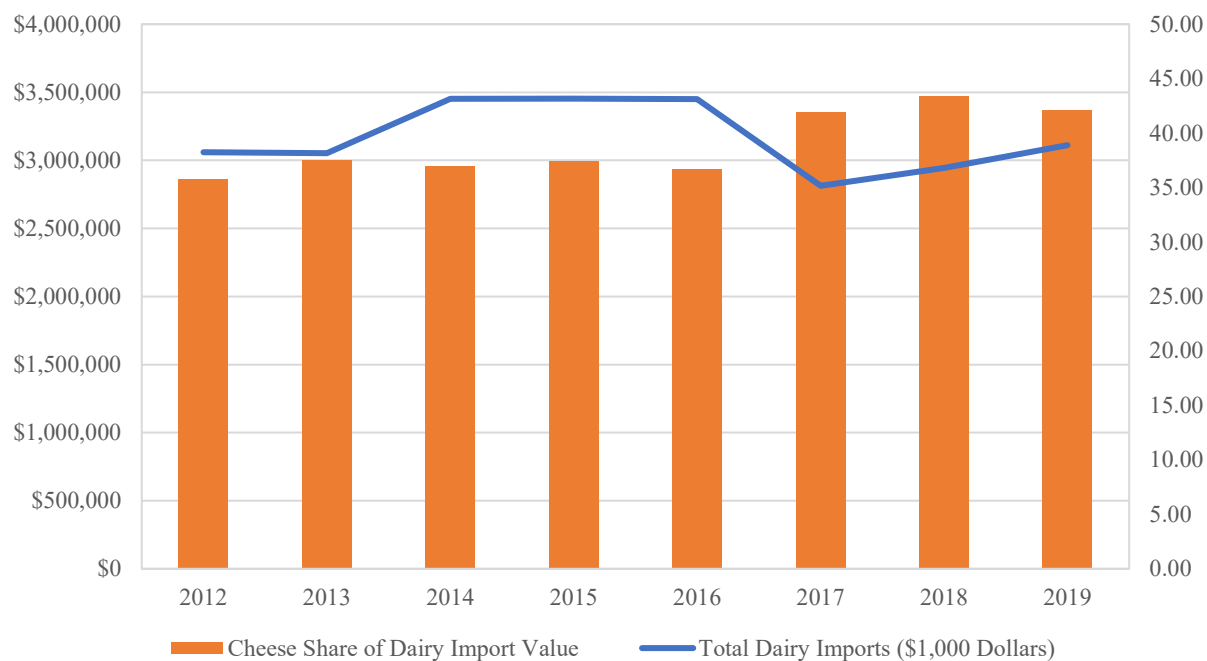
Table 3-2. U.S. Dairy Product Imports and Import Assessment Funds, 2012 to 2019¹

	2012	2013	2014	2015	2016	2017	2018	2019
Value of All Dairy Imports (\$1,000)	\$3,059,069	\$3,051,985	\$3,452,772	\$3,453,239	\$3,449,000	\$2,813,000	\$2,945,000	\$3,112,000
Value of Cheese Imports (\$1,000)	\$1,093,027	\$1,145,000	\$1,274,747	\$1,290,771	\$1,264,000	\$1,178,000	\$1,279,000	\$1,310,000
Quantity of Cheese Imports, (metric tons)	153,964	147,196	164,778	197,767	205,286	182,401	176,211	177,973
Unit Value of Cheese Imports (\$/MT)	\$7,099	\$7,779	\$7,736	\$6,527	\$6,157	\$6,458	\$7,258	\$7,361
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
Import Assessment per \$1,000 of dairy imports	\$1.15	\$1.13	\$1.03	\$1.21	\$1.38	\$1.50	\$1.29	\$1.29

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 2019.

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

Figure 3-14. U.S. Dairy Imports and Cheese Share of Dairy Import Value, 2012 to 2019



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

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

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

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-percent 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. Two key findings of the statistical analysis are as follows:

- Demand-enhancing expenditures have a significant positive impact on domestic consumption of dairy products. Domestic consumption is defined as domestic commercial disappearance plus imports.
- The promotion elasticities for butter, cheese, and fluid milk for 2019 were on average 0.050, 0.013, and 0.069, respectively. The promotion elasticities for all dairy products on a skim-solids basis and on a fat basis for 2019 were on average 0.057 and 0.051 respectively.

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 2 quarters. The effect on fluid milk persisted for up to 8 quarters and up to 12 quarters for butter. For the aggregate of all dairy products, the effect persisted for 6 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 9 quarters. The SSB export promotion expenditure elasticity was estimated to be statistically significant at 0.056 over the sample period (Table 3-3). The lag length for the FB export promotion expenditures was estimated to be 6 quarters. The FB export promotion expenditure elasticity was estimated to be statistically significant at 0.098 (Table 3-3).

Simulation Analysis of the Market Effects of Dairy Promotion

The analysis covers the period of 1995 to 2019. The results are decomposed for comparison

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.

purposes into four similar time periods: (1) 1995 to 2000, (2) 2001 to 2006, (3) 2007 to 2012, and (4) 2013 to 2019. 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 2019 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. 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.

Table 3-3. Estimated Dairy Demand Sensitivity to Promotion, Prices, and Income, 1995 to 2019

	Promotion Elasticities		Own-Price Elasticity	Income Elasticity
	1995 to 2019	2019 only		
Butter ¹	0.041	0.050	-0.057	0.357
Cheese ¹	0.018	0.013	-0.136	0.520
Fluid milk ¹	0.092	0.069	-0.071	-0.471
All dairy ¹				
Skim-solids basis	0.064	0.057	-0.066	0.097
Fat basis	0.058	0.051	-0.072	0.407
Exports ¹				
Skim-solids basis	0.056	0.056	-0.206	0.685
Fat basis	0.098	0.098	-0.300	0.578

¹Over the time period 1995.1 to 2019.4.

These results indicate that the overall downward trend of per capita fluid milk consumption between 1995 and 2019 was mitigated to some extent by the promotional efforts of the National Programs. Without the promotion programs, fluid milk consumption would have averaged 171.92 pounds per capita annually instead of 192.41 pounds per capita annually over the 1995 to 2019 period as actually occurred with promotion. Hence, promotion expenditures associated with the National Programs spending on fluid milk reduced the rate of decline in per capita consumption.

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 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.

As shown in Table 3-4, the average annual per capita consumption of fluid milk, cheese, and butter was higher by 11.9 percent, 4.0 percent, and 4.7 percent, respectively, over the period of 1995 to 2019 due to promotion efforts, all other exogenous factors held constant. The average annual per capita consumption of nonfat dry milk (NFDM) would have been 3.13 pounds per capita annually without promotion versus 3.15 pounds per capita as actually occurred with promotion over the 1995 to 2019 period, an increase of 0.7 percent.

The results also indicate that the annual per capita consumption of cheese would have averaged 31 pounds without promotion versus the 32.24 pounds as actually occurred with promotion over 1995 to 2019. For butter, annual per capita consumption would have averaged 4.73 pounds without promotion versus the 4.95 pounds that actually occurred with promotion over the same period.

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	2013 - 2019	With Promotion (lbs)	170.25	36.33	5.75	2.98
		No Promotion (lbs)	153.86	34.89	5.41	2.92
		Change (lbs)	16.39	1.44	0.35	0.06
		Percent Change	10.7%	4.1%	6.4%	2.0%
	2007 - 2012	With Promotion (lbs)	193.95	32.95	5.08	3.27
		No Promotion (lbs)	174.13	31.59	4.83	3.22
		Change (lbs)	19.82	1.37	0.25	0.05
		Percent Change	11.4%	4.3%	5.2%	1.5%
	2001 - 2006	With Promotion (lbs)	199.97	30.99	4.49	3.23
		No Promotion (lbs)	177.63	29.78	4.35	3.22
		Change (lbs)	22.34	1.21	0.14	0.00
		Percent Change	12.6%	4.1%	3.3%	0.1%
	1995 - 2000	With Promotion (lbs)	209.18	28.02	4.35	3.15
		No Promotion (lbs)	185.08	27.10	4.21	3.18
		Change (lbs)	24.10	0.92	0.14	-0.03
		Percent Change	13.0%	3.4%	3.2%	-0.9%
	1995 - 2019	With Promotion (lbs)	192.41	32.24	4.95	3.15
		No Promotion (lbs)	171.92	31.00	4.73	3.13
		Change (lbs)	20.49	1.24	0.22	0.02
		Percent Change	11.9%	4.0%	4.7%	0.7%

Source: Calculation by the authors.

Average annual per capita consumption of fluid milk, cheese, and butter were higher by 10.7 percent, 4.1 percent, and 6.4 percent, respectively, due to promotion during the 2013 to 2019 period (Table 3-4). Annual exports of butter averaged 19.9 percent less than would have occurred without promotion while annual exports of nonfat dry milk and cheese averaged 2.5 percent and 4.5 percent higher, respectively, due to promotion.

The average annual per capita consumption of cheese was also higher by 0.02 pounds (0.06 percent) as a result of the promotion funded by the importer assessment, but no appreciable changes were evident in the annual per capita consumption of butter and fluid milk. 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. Annually between 2012 to 2019, total cheese consumption in the United States amounted to 103.1 billion pounds. Because of the assessment from importers, total domestic cheese consumption was higher by 57 million pounds. To arrive at this figure, we multiply 103.1 billion pounds by the percentage change in cheese consumption as a result of the importer assessment (0.06 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 1.4 million pounds. Further, unit values of cheese imports amounted to roughly \$3.19 per pound on average annually between 2012 to 2019. Hence, incremental revenue to importers solely from cheese attributed to the import assessment totaled about \$4.5 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 in the previous section. As calculated, the producer profit BCR is the additional industry profits (additional cash receipts net of additional production costs and promotion assessments) earned by producers as a consequence of the promotion expenditures (as measured through the scenario analyses) divided by the historical level of promotion 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 a comparative analysis, results for the “promotion” and “no-promotion” scenarios as summarized in the previous section (see Table 3-4), 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.

Table 3-5. Calculated Benefit-Cost Ratio (BCRs), in Net Profit at the Producer Level Attributable to the National Programs, 1995 to 2019

Producers	
Product	BCR
All Dairy	4.76
Fluid milk	3.26
Cheese	3.62
Butter	24.40
Exports	6.94
Other Non-Specific Dairy Promotion	6.79

As exhibited in Table 3-5, over the period 1995 to 2019, 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 \$3.26 for every dollar invested in dairy demand promotion; for cheese, \$3.62 for every dollar invested; and for butter, \$24.40 for every dollar invested. For other non-specific dairy promotion activities, the BCR was calculated to be \$6.79 for every dollar invested. Dairy export promotion expenditures increased foreign demand for U.S. dairy products by \$6.94 for

every dollar invested. For the aggregate of all dairy products, the net profit BCR is \$4.76 for every dollar invested.

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. In contrast, MilkPEP promotion expenditures have targeted fluid milk exclusively. The scenario simulation results indicate that the BCR associated with DMI spending was calculated to be 5.59, a bit higher than the 4.76 return on investment shown in Table 3-5 for all dairy product promotion investments. The BCR for MilkPEP was calculated at 3.28, nearly identical to the 3.26 return calculated for all fluid milk promotional spending in Table 3-5.

The BCR for fluid milk at the processor level was estimated to be 5.61 over the period between 1995 and 2019. 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 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 2019 period.

Concluding Remarks³

³ A reference list is available upon request.

This report provides an independent evaluation of the effectiveness of the National Programs covering the period 1995 to 2019. 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 profit over costs) of the dairy producer promotion program was calculated to be 4.76. That is, for every \$1 spent on demand-enhancing activities, dairy producers received an additional \$4.76.
- Promotion funds collected from importers boosted the annual average level of cheese imports by 1.4 million pounds. Annual unit values of cheese imports amounted to about \$3.19 per pound on average over the period from 2012 to 2019. Hence, the incremental revenue to importers solely from cheese attributable to the expenditure of the import assessments for cheese promotion totaled roughly \$4.5 million.
- The BCR for fluid milk promotion was calculated to be \$3.26 for every dollar invested in demand-enhancing activities. For cheese promotion, the BCR was calculated to be \$3.62 per dollar invested in cheese promotion and \$24.40 for every dollar invested in butter promotion. The BCR for dairy export promotion was calculated to be \$6.94 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 2019 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 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.

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 (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 assessments directed to the Qualified Programs in 2019 was \$298 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 2019.

**2019 Qualified State, Regional or Importer Dairy Product Promotion,
Research or Nutrition Education Programs Aggregate Income and
Expenditure Data Reported to USDA
(Thousands)**

Aggregate Income	FY 2019
Carryover from Previous Year ¹	\$82,094
Producer Remittances	219,499
Transfers from Other Qualified Programs	67,095
Transfers to Other Qualified Programs	(78,813)
Other Income	<u>7,899</u>
Total Adjusted Annual Income	<u>\$297,775</u>
Aggregate Expenditures	FY 2019
General and Administrative	\$12,069
Milk Advertising and Promotion	13,970
Cheese Advertising and Promotion	30,420
Butter Advertising and Promotion	7,225
Frozen Dairy Products Advertising and Promotion	4,349
Other Advertising and Promotion ²	9,314
Unified Marketing Plan ³	79,508
Dairy Foods and Nutrition Research	8,012
Public and Industry Communications	24,563
Nutrition Education	16,225
Market and Economic Research	4,878
Other	<u>6,289</u>
Total Annual Expenditures	<u>\$216,822</u>
Total Available for Future Year Programs	\$80,952

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

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

³ This line reflects 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.

**2019 Qualified State, Regional or Importer Dairy Product Promotion,
Research or Nutrition Education Programs**

Alabama:

- American Dairy Association of Alabama

- Southeast United Dairy Industry Association (d/b/a Dairy Alliance)
- American Dairy Association of Georgia

Arizona:

- Dairy Council of Arizona

Idaho:

- Idaho Dairy Products Commission
- Dairy West

California:

- California Milk Advisory Board
- Dairy Council of California

Illinois:

- Illinois Milk Promotion Board

Connecticut:

- Connecticut Milk Promotion Board

Indiana:

- American Dairy Association of Indiana
- Indiana Dairy Industry Development Board

Florida:

- Florida Dairy Farmers, Inc.

Georgia:

- Georgia Agricultural Commodity Commission for Milk

Kansas:

- Kansas Dairy Commission

Kentucky:

- American Dairy Association of Kentucky

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 Promotion Board

Michigan:

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

Minnesota:

- Midwest Dairy Association
- Midwest Dairy Council
- Minnesota Dairy Research and Promotion Council

Mississippi

- American Dairy Association of Mississippi

Missouri:

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

Nebraska:

- Nebraska Dairy Industry
Development Board

Nevada:

- Dairy Council of Nevada

New Hampshire:

- Granite State Dairy Promotion

New Jersey:

- New Jersey Dairy Industry Advisory
Council

New York:

- American Dairy Association and
Dairy Council (d/b/a 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.

North Carolina:

- American Dairy Association of
North Carolina

North Dakota:

- North Dakota Dairy Promotion
Commission

Ohio:

- American Dairy Association Mideast

Oregon:

- Oregon Dairy Products Commission

Pennsylvania:

- Allied Milk Producers' Cooperative
- Mid-Atlantic Dairy Association
(d/b/a American Dairy Association
Northeast)
- Pennsylvania Dairy Promotion
Program

Puerto Rico, Commonwealth of:

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

South Carolina:

- American Dairy Association of South Carolina

South Dakota:

- American Dairy Association of South Dakota

Tennessee:

- American Dairy Association of Tennessee
- Tennessee Dairy Promotion Committee

Texas:

- Dairy Max, Inc.
- Western Dairy Association
- Southwest Dairy Museum

Utah:

- Utah Dairy Commission

Vermont:

- Vermont Dairy Promotion Council

Virginia:

- American Dairy Association of Virginia

Washington:

- Washington State Dairy Council
- Washington Dairy Products

Wisconsin:

- Wisconsin Milk Marketing Board (d/b/a Dairy Farmers of Wisconsin)

Qualified Importer Programs:

- Cheese Importers Association of America
- Wisconsin Milk Marketing Board (d/b/a Dairy Farmers of Wisconsin)
- Global Dairy Platform

2019 Dairy Management Inc. and U.S. Dairy Export Council Contracts Approved by USDA

Contractor Name [Contract Activities]

B = Business Development	C = Communications	Co = Consultants
F = Fluid Milk Revitalization	60 = Fuel Up to Play 60	E = Exports
N = Nutrition and Wellness	I = Ingredients	K = Knowledge and Insights
P = Partnerships	S = Sustainability	U = Unified Marketing Plan

Academy of Nutrition and Dietetics [N]	Center for Food Integrity [C]
Advantage Point Internationale, LLC [C]	CFE Solutions, Inc. [Co]
Agribusiness-Connect Asia [E]	CliftonLarsonAllen, LLP [B]
American Academy of Pediatrics [N]	College & Professional Sports Dieticians [N]
American Butter Institute [U]	Commonwealth Agriculture Strategies [K]
American College of Sports Medicine [N]	ConferenceDirect, LLC [B]
American Dairy Association Indiana, Inc. [U]	Costco Wholesale Corporation [B, K]
American-Mexican Marketing [E]	Cowboy Media Productions, LLC [C, E]
American Society for Nutrition [N]	Crimson Hexagon [C]
Arab Marketing Finance, Inc. [E]	Crowd Companies, LLC (Catalyst) [C]
Bader Rutter and Associates, Inc. [C, E, S]	Culinary Institute of America [I]
Baxter Communications, Inc. [C]	Current Marketing – Brandwitch Consumer
Bodhi Road, Inc. (Fresh Company) [B]	Research [Co]
C+R Research Services [F, K]	CustomED [C]
Cady, Roger [Co]	Dairy Council of Utah [U]
Campus Kitchen [B]	Dairy Farmers of America [P]

Dairy Girl Network [B]	Foodsense, LLC [C, N]
Dairy Insights, LLC [Co, E]	Global Dairy Platform, Inc. [C]
Dairy Max, Inc. [U]	GlobalData Plc (Canadean Consumer) [E, K]
Darigold, Inc. [P]	Hartman Group [K]
Digital SpeakEasy, LLC [C, S]	Hebrew Rehabilitation Center [K]
Discovery Education, Inc. [C]	Hillstrom Communications, Inc. [C]
Domino's Pizza Enterprises – Japan [E]	Hruska, Cindy [B, E]
Domino's Pizza Enterprises – Oceania [E]	Hutchinson Cancer Research Center [K]
Domino's Pizza, LLC [P]	IDEA Health & Fitness [C]
DuPuis Group [C, F]	Information Resources, Inc. [K]
Dutcher & Associates, LLC [C]	Inmar Analytics, Inc. [K]
EAS Consulting Group [I]	Innerspace Studio [C]
Eat Well Global, Inc. [N]	Innova Market Insights [K]
Edelman Public Relations Worldwide [C, 60]	International Dairy Foods Association [E, K]
Ernst & Young Global Limited [B]	Interpublic Marketing Services, Ltd., Beijing Branch (Weber Shandwick Shanghai) [E]
Exponent, Inc. [K]	IntNet (South Korea) [E]
Family Room Strategic Consulting Group [K]	Ipsos Insights, LLC [I, K]
Feeding America [P]	JF Pontzer, LLC [C]
Fleishman-Hillard, Inc. [C]	Joslin Diabetes Center, Inc. [N]
Florida Dairy Farmers, Inc. [U]	Kantar, LLC, d/b/a Kantar TNS [C]
Food Research and Action Center [N]	Kantar Retail d/b/a Kantar Worldpanel [K]
FoodMinds, A Division of Padilla Speer Beardsley, Inc. [E, I]	Keenan, Judy [Co]

Shainwright Consulting & Research Group [E]	The Foundation for National Institutes of Health [N]
Shamrock Foods Company [P]	
Sheryl Stern Sachman & Associates, LLC [N]	The Fresh Approach, Inc. [C]
Significant Outcomes [E]	The Kroger Company [P]
Sorenson, Carla [Co]	The McCully Group [E, I]
Southeast United Dairy Industry Association	The Richards Group, Inc. [F, C]
d/b/a The Dairy Alliance [U]	Think Healthy Group, Inc. [C]
sparks & honey, LLC [C, K]	TNS Custom Research, Inc., d/b/a Kantar
Spire Research and Consulting [Co, E]	Worldpanel [K]
Spredfast [K]	TradeMoves, LLC [E, K]
Story Consulting [Co, E]	United Dairymen of Arizona [U]
Strategy Muse [K]	USDA Agriculture Research Service, Western
Taco Bell Corporation [P]	Human Nutrition Research Center [K]
Taylor, Tammy [Co]	Washington Dairy Products Commission [U]
Team Services, LLC [60]	Watson Green, LLC [B, N, U]
Technomic, Inc. [K]	We Are All Human Foundation [B]
Texas A&M AgriLife Research [K]	Weber Shandwick Worldwide [C]
The Center for Generational Kinetics [N]	World Wildlife Fund, Inc. [C]
The Context Network, LLC [S]	Youth Improved, Inc., d/b/a GenYouth [N, 60]
The Economist Intelligence Unit, NA, Inc. [C]	Yum! Restaurants International, Inc. [P]
	Zenith International, Ltd. [E, I]

**2019 National Fluid Milk Processor Promotion Board
Contracts Approved by USDA**

Contractor Name [Contract Activities]

A = Advertising and Marketing

K = Knowledge and Insights

B = Business Development

P = Partnerships

37 Front Street, LLC [K]

CMGRP, Inc., d/b/a Weber Shandwick [A]

Abrams, Dr. Steven [K]

Coastal Brand Management, LLC [A]

Academy of Nutrition and Dietetics

Coffee and Champagne, LLC [A]

Foundation [K]

Collective Bias [A]

Alvarado, Reese [A]

Command Entertainment Group, Inc. [A]

Anderson, Tyler [A]

Crazy Cool Media, LLC [A]

Anoia, Dave [A]

Crème de la Crumb, LLC [A]

Arc USA Chicago [A]

Dairy Management Inc. [P]

Barr, Dr. Susan [K]

DoExtra CRM Solutions, LLC [B]

Beashion, LLC [A]

Dunston, Rachel [A]

Barberet, Cedric [A]

Economos, Dr. Christina [K]

Bazilian, Inc. [A]

Edwards, Tiffany [A]

Brier, Michele V. [B]

Egg Strategy, Inc. [K]

Bluetext, LLC [B]

eNRG Performance [A]

Calabasas Pediatrics [A]

Escobar, Su-Nui [A]

Campbell, Ewald [A]

Feeding America [P]

FeedFeed [A]
Food for Thought Consulting, Inc. [K]
Gail Golden Consulting, LLC [B]
Garnett, Hayley [A]
Gordon, Sam [A]
Greenpoint Pictures [A]
Green, Tiffany [A]
Gregory, Lee [A]
Gutierrez, Gustavo [A]
Hamaguchi, Carly [A]
Hartman Group [B]
Hill, Dr. James [K]
Hutchins, Emily [A]
Hutzler, Jenny [A]
Information Resources, Inc. [B]
InTech Integrated Marketing Services [B]
International Dairy Foods Association [B]
Interpublic Group of Companies, Inc. [A]
James Madison University [K]
JBJ Group Enterprises, LLC [A]
Jiang, Xuechen [A]
Joanne Davis Consulting, Inc. [K]
Johnson, Dr. Rachael [K]
JR15, Inc. [A]
Kailyn Lowry, LLC [A]
KGL Sports, LLC [A]
Leidy, Dr. Heather [K]
Lopez, Ilma [A]
Lowe & Partners Worldwide, Inc., d/b/a
socioAD [A]
May, Gavin [A]
Milk and Honey, LLC [A]
Melgoza, Maria [A]
Molly Yeh, LLC [A]
Neal, CJ [A]
Nielsen Consumer Neuroscience, Inc. [K]
Next Step Consulting Services [K]
Nguyen, Jimmy [A]
Oh Sweet Basil, LLC [A]
One Funny Mother, Inc. [A]
Otis, James [A]
Parker Talent Management [A]
Penner Media, Inc. [A]
Petty, Maximillian [A]
Pondera Advisors, LLC [B]
Popular Pays, Inc. [A, B]

Prime Consulting Group [A]
Protagonist, LLC [K]
Rachel Paul Nutrition, LLC [A]
Radius Global Market Research [K]
Raffin, James [A]
Red Spark Consulting, LLC [A]
Richards, Doyin [A]
Rinny Runs Endurance Sports, Inc. [A]
Rizzo, Natalie [A]
Roundarch Isobar, Inc. [A]
Rubin, Ronald [B]
Sansonetti, Damian [A]
Saunders, Dr. Michael [K]
Shapiro, Dr. Ilan [A]
Shores, Summer [A]
Smith, Abby[A]
Smithfield Packaged Meats Sales Corp. [P]
Snyder-Cohn, PC [B]
Spectrum Group Productions, Inc. [B]
SuperAwesome, Inc. [A]
Super Mamas, LLC [A]
Talent Resources [A]
Tennis4Sloane, Inc. [A]
Tetrick, Alison [A]
The Colony Group, LLC [B]
The Hershey Company [P]
The Marketing Arm, Inc. [A]
Thirty Handmade Days, Inc. [A]
Thompson, Klay [A]
United States Olympic Committee [P]
United States Swimming, Inc. [P]
Victory Marketing Agency, LLC [B]
Watson, Eric [A]
Watkinson Miller, PLLC [B]
Wettstein, Bryce [A]
Whistle Sports, Inc. [A]
Whitney Port, Inc. [A]
Wiggins, Elise [A]
Wilkin, Claudette Aimee [A]
Winter, Alli [A]
Wiser Partners, LLC [B]
Women/360 Management [A]

2019 National Dairy Foods Research Centers

There are six university-affiliated National Dairy Foods Research Centers, established in 1987. They are supported by the National Dairy Council, and their mission 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 their mission. The centers transfer knowledge to the industry by developing future professionals, offering technical assistance and short courses, and providing technical training. Application labs within the centers assist in concept creation, prototype development, troubleshooting, scale-up, sensory work, and consumer evaluation.

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.umn.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

2019 Competitive Research Activities – Nutrition

Principal Investigator, Institution, Project Title, and Status

Lacy Alexander, PhD (Pennsylvania State University): *Milk and Cheese Consumption and Human Microvascular Function* [concluded 2019].

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 2019].

Christopher Blesso, PhD (University of Connecticut): *Milk Phospholipids for the Prevention of Atherosclerosis* [concluded 2019]; *A Review of the Health Benefits of Milk Phospholipids* [commenced 2019].

Bradley Bolling, PhD (University of Wisconsin-Madison): *Anti-Inflammatory Activity of Yogurt Mediated by the Intestinal Barrier* [commenced 2019].

Richard Bruno, PhD (Ohio State University): *Alleviation of Metabolic Endotoxemia in Adults with Metabolic Syndrome with Milk Fat Globule Membrane* [concluded 2019].

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* [commenced 2019].

In-Young Choi, PhD (University of Kansas Medical Center): *Dairy Intake and Cerebral Antioxidant Defense in Aging: A Dietary Intervention Study* [ongoing 2019].

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 2019].

Sharon Donovan, PhD, RD, and Barbara Fiese, PhD (University of Illinois at Urbana-Champaign): *STRONG Kids 2: A Cells-to-Society Approach to Nutrition in Early Childhood* [ongoing 2019].

Adam Drewnowski, PhD, Colin Rehm, PhD, MPH (Nutriscore), and Victor Fulgoni, PhD (Nutrition Impact): *Replacing Dairy Fat with Pufas: A Food Level Modeling Study of Diet Quality and Nutrient Intake* [concluded 2019]; *Towards a New Nutrient Density Score: An NRF Nutrient Profiling Tool for Global Use* [commenced 2019].

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* [ongoing 2019].

Darcy Freedman, PhD, MPH (Case Western University): *Modeling the Future of Food in Your Neighborhood Study* [ongoing 2019].

Foundation for the National Institutes of Health: *The Performance of Novel Cardiac Biomarkers in the General U.S. Population* [ongoing 2019].

Osama Hamdy, MD, PhD, FACE (Joslin Diabetes Center): *Dairy and Type 2 Diabetes: Research, Outreach, and Education* [ongoing 2019].

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 2019].

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 2019].

Jana Kraft, PhD (University of Vermont): *Full-Fat Yogurt and Glucose Tolerance* [ongoing 2019]; *Dairy Fat Consumption and the Risk of Metabolic Syndrome: An Examination of the Unique Fatty Acids in Dairy. Narrative Review* [concluded 2019].

Mario Kratz, PhD, MS (Fred Hutchinson Cancer Research Center - University of Washington): *The Impact of Low-fat and Full-fat Dairy Consumption on Glucose Homeostasis* [concluded 2019].

Ronald M. Krauss, MD (Children's Hospital Oakland Research Institute): *Effects of a Modified High-Fat Mediterranean Dietary Pattern on Lipoprotein and Inflammatory Markers of CVD Risk in Adults* [concluded 2019]; *A Randomized Study of the Effect of Replacing Sugar-Sweetened Soda by Reduced Fat Milk on Cardiometabolic Health in Male Adolescent Soda Drinkers* [concluded 2019].

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 2019].

Andrew Mente PhD, MA (McMaster University [co-funding with Dairy Farmers of Canada]): *Dairy Consumption and Cardiovascular Disease in Diverse Populations* [ongoing 2019].

Daniel Moore, PhD (University of Toronto): *Anabolic Potential of Dairy and Dairy Products for Active Children and Adolescents* [ongoing 2019].

Lynn L. Moore, DSc, MPH (Boston University School of Medicine): *Cardiometabolic Effects of Butter and Other Fats and Oils in Framingham Offspring Study Adults* [ongoing 2019]; *Yogurt and Total Dairy Intake Among Women: Effects on Weight Change and Fracture Risk During Critical Life Stages* [ongoing 2019].

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 2019].

Kristin Nieman, PhD (Katalyses, LLC): *Dairy and Inflammation: A Systematic Review of the Evidence* [concluded 2019].

Yanni Papanikolaou, PhD (Nutritional Strategies, Inc.): *Dairy Food Consumption and Association with Mortality Risk* [commenced 2019]; *Animal Protein Intake and Association with Mortality Risk* [commenced 2019].

Stuart Phillips, PhD (McMaster University): *The Mechanistic Underpinning of Protein Quality and Quantity in Aging Skeletal Muscle: A High Sensitivity Proteome Profiling Approach* [commenced 2019].

Stephen Ritchie, PhD (University of Alabama): *Functionalized Mesh Materials for Listeria Mitigation in Milk and Milk-Derived Products Processed in Dairy Plants* [ongoing 2019].

Shivani Sahni, PhD (Harvard University - Hebrew Rehabilitation Center): *Dairy Food Intake, Vitamin D Status and Bone Measures* [ongoing 2019].

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 2019].

Lyn Steffen, PhD, MPH, RD (University of Minnesota): *Dairy Consumption, Dietary Patterns and Cardiac Phenotypes* [ongoing 2019].

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 2019].

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* [ongoing 2019]; *Effect of Dairy, Calcium and Vitamin D Intakes on Bone Health across the Lifespan: A Systematic Review and Consensus Report* [ongoing 2019].

Gareth Wallis, PhD (University of Birmingham [United Kingdom]): *Exploring Novel Uses for Lactose Constituents in Sports Nutrition* [ongoing 2019].

Connie Weaver, PhD (Purdue University): *The Effect of Dairy vs. Plant-Based Beverages on Bioavailability of Calcium and Vascular Function* [ongoing 2019].

2019 Competitive Research Projects – Product

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 2019].

Jayendra K. Amamcharla, PhD (Kansas State University): *Altering the Microstructure to Improve Functionality of Dairy Powders Using Micro- and Nano-Bubbles* [Concluded 2019]; *Development and Evaluation of Selective Methods for Rapid Detection of Bacillus Endospores in Nonfat Dry Milk* [ongoing 2019]; *Development, Characterization, and Evaluation of Modified Milk Protein Concentrate with Enhanced Functional Properties* [concluded 2019].

Jayendra K. Amamcharla, PhD (Kansas State University), and Lloyd Metzger, PhD (South Dakota State University): *Understanding the Effects of Various Intrinsic and Extrinsic Factors on the Stability of Lactose-Rich Co-Product* [ongoing 2019].

Samuel Alcaine, PhD (Cornell University): *Evaluation of Protective Bacterial Cultures for the Effective Control of Listeria in High Risk Cheese* [concluded 2019]; *Evaluation Of Commercial Bio-Protective Cultures and their Ability to Inhibit the Outgrowth of Eukaryotic Spoilers in Cheese* [concluded 2019]; *Create Nationwide Food Safety Resources and Provide Support for Artisan/Farmstead Dairy Producers* [ongoing 2019].

Sanjeev Anand, PhD (South Dakota State University): *Scale Up of Hydrodynamic Cavitation as an In-Line Process Combined with Milk Pasteurization for Sporeformer Control* [concluded 2019]; *To Identify Quorum Inhibitor Based Anti-Biofilm Molecules for Developing New Generation Membrane-Biofilm Cleaners for the Dairy Industry* [ongoing 2019].

David M. Barbano, PhD (Cornell University), and MaryAnne Drake, PhD (North Carolina State University): *The Impact of Milk and Whey Protein Based Ingredients on Sensory and Physical Properties of Beverages* [concluded 2019]; *The Role of Protein, Protein Ratio, and Fat Content on Consumer Acceptance* [concluded 2019].

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 2019].

Andreia Bianchini, PhD (University of Nebraska): *Application of Interventions at Farm Level to Reduce Sporeformer Bacteria* [ongoing 2019].

Stephanie Clark, PhD, and Tong Wang, PhD (Iowa State University): *Technology for Novel and Scalable Isolation of Dairy Phospholipids (PL) and its Stabilization Against Lipid Auto-Oxidation* [concluded 2019].

Michael Culhane, PhD (Dairy Advance Business Consulting): *Optimizing Research Strategies for Whey Protein Technology Development* [commenced 2019].

Dennis D'Amico, PhD (University of Connecticut): *Determining the Efficacy of Glycolipids to Control Listeria Monocytogenes in Queso Fresco* [ongoing 2019].

Robert Dando, PhD (Cornell University): *Eliminating Photosensitive Absorption Bands from LED Light Engines to Preserve Dairy Quality* [concluded 2019].

MaryAnne Drake, PhD (North Carolina State University): *Southeast Dairy Center Application Laboratory Program* [ongoing 2019]; *The Role of Packaging on the Flavor of Fluid Milk*

[concluded 2019]; *Consumer Perception of Sustainability and its Relation to Labeling Dairy Foods and Ingredients* [ongoing 2019]; *MCC Purity and Functionality for Ingredient Applications* [ongoing 2019]; *Comparison of the Efficiency of Ceramic and Polymetric Microfiltration Removal of Whey Protein from Sweet Whey* [ongoing 2019]; *The Impact of Dairy Protein Fraction on the Physical and Sensory Properties of High Protein, Low Fat Vanilla Ice Cream* [commenced 2019]; *Determination of Child Preferences for Milkfat in Milk* [commenced 2019].

David W. Everett, PhD (California Polytechnic State University-San Luis Obispo): *California Dairy Center Application Laboratory Program* [ongoing 2019]; *Improving the Flavor of Cheese Made from Powdered Milk Using Buttermilk* [ongoing 2019].

Kathleen Glass, PhD (University of Wisconsin-Madison): *Inhibition of Clostridium Botulinum in Reduced-Sodium Pasteurized Cheese Products – Validation of Model 2* [concluded 2019]; *Role of Listeria Monocytogenes in High-Moisture Cheese: Supplemental Funding to Determine the Effect of Propionic Acid* [concluded 2019]; *Safety of Reduced Sodium Processed Cheese* [concluded 2019]; *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* [commenced 2019].

Julie Goddard, PhD (Cornell University): *Mining Value Added, Naturally Derived, Sweeteners from Dairy Co-Product Streams* [ongoing 2019].

Lisbeth Goddik, PhD (Oregon State University): *A Comprehensive Approach to Reducing the Risk of E. Coli in Bloomy Rind Cheeses: Product Reformulation and HPP* [concluded 2019].

Selvarani Govindasamy-Lucey, PhD (University of Wisconsin-Madison): *Controlling Cheese Acidity by Adjustment of the Lactose to Protein Content of Cheese Milk* [concluded 2019]; *Extending the Shelf-Life Performance of Natural Mozzarella Cheese for Export Markets* [concluded 2019]; *High Quality Block Gouda by Dry Salting Method* [ongoing 2019]; *Innovative Powders and Cheesemaking Processes for the Overseas Manufacture of Recombined Cheeses* [commenced 2019]; *Effect of Depleting Caseins from Native Micelles on the Viscoelastic Behavior and Interfacial Properties of Skim Milk and Micellar Casein Solutions* [commenced 2019]; *Shelf-Stable Snacks Made by Extrusion of Natural Cheeses* [commenced 2019].

Federico Harte, PhD (Pennsylvania State University): *High Pressure Jet Spray Drying to Create Novel Dairy Powders* [ongoing 2019]; *Prototype to Study the Effect of Ionic Environments on Casein Micelle Integrity* [concluded 2019]; *Effects of Calcium Chelation and Alteration of Serum Composition on Low Temperature Gelation of Concentrated Milk Protein Solutions* [commenced 2019].

Richard Harte, PhD (University of Wisconsin-Madison): *Application of Select Dairy Ingredients to Enhance Shelf Life, Physical Properties and Sensory Attributes of High Protein Frozen Dairy Dessert* [commenced 2019].

Tu-Anh Hyunh, PhD (University of Wisconsin-Madison): *A Novel GRAS Natural Antimicrobial to Control Listeria in the Dairy Processing Environment* [commenced 2019].

Shinya Ikeda, PhD (University of Wisconsin-Madison): *Inhibiting the Formation of Poorly Soluble Skin Layers on High Milk Protein Powders* [concluded 2019].

Helen Joyner, PhD (University of Idaho): *Enhancing the Functionality of Milk Protein Concentrate through Direct Steam Injection Cooking* [Ongoing 2019]; *Creating Cleaner Label Process Cheese Foods by Replacing Emulsifying Salts with Dairy Proteins* [commenced 2019].

Mark Johnson, PhD (University of Wisconsin-Madison): *Improving the Functionality and Quality of Large Cheese Blocks* [ongoing 2019]; *Use of Extrusion Technology for Snack Cheeses* [ongoing 2019]; *Innovative Approaches to Increase the Shelf Life of String Cheese and Fresh Cheese Curds* [commenced 2019].

John A. Lucey, PhD (University of Wisconsin-Madison): *Wisconsin Center for Dairy Research Applications Laboratory* [ongoing 2019]; *Designing Novel Cheese with High Levels of Intact Casein* [concluded 2019]; *Separation and Characterization of Phospholipids from Whey Protein Phospholipid Concentrate (WPPC), and Other Dairy Feed Streams* [concluded 2019]; *Impact of Microfiltration Retentates on Cheese Quality* [ongoing 2019]; *New Membrane Technology to Make High-Value Dairy Ingredients* [ongoing 2019]; *Controlled Pilot-Plant-Scale Evaluations of Charged Spiral-Wound Ultrafiltration Membranes* [ongoing 2019]; *Creating a Dairy Emulsifier Alternative like Lecithin* [ongoing 2019]; *Novel Ceramic Nanofiltration to Improve Coproduct Quality and Increase Utilization* [commenced 2019].

Curtis Lockett, PhD (University of Tennessee): *Preference Mapping of the Chinese Cheese Market* [commenced 2019].

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* [commenced 2019].

Melha Mellata, PhD (Iowa State University): *Controlling Listeria Monocytogenes in Fresh Cheeses with High Voltage Atmospheric Cold Plasma (HVACP) Treatment - Phase II* [commenced 2019].

Sergio Martinez-Monteagudo, PhD (South Dakota State University): *Development of a Two-Step Process for the Production of Food Ingredients from Whey Permeate* [ongoing 2019].

Sergio Martinez-Monteagudo, PhD (South Dakota State University), and Tonya Schoenfuss, PhD (University of Minnesota): *Effective Phospholipids Extraction from Dairy Byproducts using Switchable Solvents* [commenced 2019].

Lloyd Metzger, PhD (South Dakota State University): *Midwest Dairy Foods Applications Laboratories Program* [ongoing 2019]; *Scale-Up and Implementation of Strategies to Improve Quality and Process Efficiency During Manufacturing of Dairy Ingredients* [concluded 2019]; *Comparison of Functionality and Properties of Liquid Concentrates and Dried Dairy Ingredients* [concluded 2019].

Carmen Moraru, PhD (Cornell University): *Use of Forward Osmosis as a Non-Thermal Method of Concentration for the Manufacture of High-Quality Milk Concentrates and Powders* [concluded 2019].

Daniel Noguera, PhD (University of Wisconsin-Madison): *Microbial Production of Value-Added Constituents from Lactose-Rich Dairy Coproducts* [commenced 2019].

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 2019].

Pamela Pehrsson, PhD (USDA-Agricultural Research Service): *Estimating the Nutritive Value of Fluid Cow's Milk in The U.S.* [commenced 2019].

Scott A. Rankin, PhD and George Huber, PhD (University of Wisconsin-Madison): *Catalytic Conversion of Lactose-Rich Co-Products into Value-Added Components* [concluded 2019]; *Production of Lactose-Free Dairy Products by the Catalytic Hydrolysis of Lactose in Dairy Streams with Solid Acid Catalysts* [commenced 2019].

Tonya Schoenfuss, PhD (University of Minnesota): *Improving Sensory and Functional Properties of Reduced Sodium Low-Moisture Part-Skim Mozzarella Cheese Via Brine and Make Procedure Modifications* [concluded 2019].

Clint Stevenson, PhD, and MaryAnne Drake, PhD (North Carolina State University): *Food Safety Course for Artisan and Farmstead Cheesemakers* [ongoing 2019].

Jeyamkondan Subbiah (University of Nebraska-Lincoln): *Microbial Inactivation Kinetics of Salmonella Spp. in Dairy Powders* [commenced 2019].

Martin Wiedmann, PhD, DVM (Cornell University): *Evaluation of Variation in Spore Count Methods and Determination of Optimal Parameters for Standardization of Milk Powder Spore Testing* [concluded 2019].

Haotian Zheng, PhD (California Polytechnic State University-San Luis Obispo): *The Milk Fat Globule Membrane Generates Flavor in Cheese Made from Recombined Milk* [concluded 2019].

Qixin Zhong, PhD (University of Tennessee): *Improving Functionalities of Spray-Dried Skim Milk Powder by Supplementing Soluble Caseins* [commenced 2019].

2019 Competitive Research Activities – Sustainability

Principal Investigator, Institution, Project Title, and Status

Olivier Jolliet, PhD (University of Michigan): *Dairy's Nutritional Benefit and Environmental Impact – Phase II* [ongoing 2019].

Lehmann, Johannes, PhD (Cornell University): *Thermo-Chemical Technologies for Manure-Based Products - Education and Outreach for the Dairy Industry* [commenced 2019].

Ermias Kребreab, PhD (University of California - Davis): *Feed Additives as a Strategic Approach to Reduce Enteric Methane Production in Cattle* [ongoing 2019].

Meredith Niles, PhD (University of Vermont): *Assessing Dairy Farmer Decisions and Barriers for Adopting Sustainable Manure Management Systems* [concluded 2019].

M.B. de Ondarza, PhD (Paradox Nutrition): *Amounts and Environmental Stewardship Benefits of By-Product Feed Ingredients used in U.S. Dairy Cow Nutrition* [commenced 2019].

Kristan Reed, PhD (Cornell University): *The Ruminant Farm System Model - Dairy Cow Ration Formulation and Feed Allocation Modules* [commenced 2019].

Mathew Ruark, PhD (University of Wisconsin-Madison): *Climate Change Mitigation and Adaptation in Dairy Production Systems of the Great Lakes Region* [concluded 2019].

Robin White, PhD (Virginia Polytechnic Institute and State University): *Nutritional and Environmental Consequences of Dairy Removal from U.S. Agriculture* [ongoing 2019]; *Supply of Nutrients and Environmental Impacts of Milk Production at Global, Regional, and Country Specific Scales* [concluded 2019].