

Analysis of Dairy Export Potential Through the Port of Philadelphia¹

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Executive Summary

This component of the *Study to Support Dairy Growth and Competitiveness* describes the current capabilities of the Port of Philadelphia (branded PhilaPort as of March 2017) to support growth in dairy product exports, assesses the port's historical role in dairy product exports from the US and the mid-Atlantic, and estimates selected economic impacts of reallocation of dairy product exports from other ports to PhilaPort.

Our key findings are:

- PhilaPort appears to have the capabilities, capacity and relationships with relevant shippers (dairy product exporters) and service providers (such as steamship lines) to support substantial growth in dairy product exports. This capability will be enhanced further by expansions funded by state government and currently under implementation;
- Dairy product exports from the Philadelphia Port District included a wide range of dairy products and a diverse set of country destinations—more than 80 countries received product shipped from the ports in the district during 2007 to 2016;
- Despite extensive capabilities and historical product and market diversity, the share of US dairy exports departing from the Philadelphia Port District has been small—less than 1% on a value basis during 2007 to 2016. They comprise only about 6% of exports from mid-Atlantic ports (New York, Norfolk, Baltimore and Washington, DC);
- In 2016, the Philadelphia Port District ranked 17th of 41 US port districts in the value of dairy product exports, with the largest districts (Los Angeles, San Francisco, Laredo, TX, Seattle and El Paso, TX) accounting for nearly two-thirds of total US dairy product exports on a value basis;
- The product mix exported and country destinations for exports through the Philadelphia Port district differ from those for the US as a whole. Ice cream and processed cheese were more important for the Philadelphia Port District during 2007 to 2016, and the principal export destinations were Australia, New Zealand, and Latin America. Relatively small amounts of key US exports such as NDM or dry whey were shipped through the Philadelphia Port District, and essentially no product shipped from the ports in the district went to major US export markets such as Mexico, Canada, or Asian countries;

¹ The analyses described in this document are one component of the *Study to Support Growth and Competitiveness of the Pennsylvania Dairy Industry*, which has been funded by the Pennsylvania Department of Agriculture and the Center for Dairy Excellence.

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- A relatively small number of country-product combinations accounted for the majority of the value of dairy product exports from the Philadelphia Port District during 2007 to 2016. Twelve country-product combinations accounted for more than 60% of the value of dairy product exports during these years. Ten country destinations accounted for more than 80% of the value of exports from the Philadelphia Port District;
- Reallocation of 2016 dairy product exports to PhilaPort rather than other mid-Atlantic ports would increase farm-level milk values, reduce the costs of milk assembly to processing plants, and reduce product distribution costs. The total net benefit is estimated to be about \$1.8 million per year, excluding economic multiplier impacts. This net benefit is about \$0.02/cwt on all milk produced in Pennsylvania.

Background and Study Objectives

Access to cost-effective transportation and logistics services is essential for competitiveness in global dairy markets. The Port of Philadelphia (now branded PhilaPort) provides a substantive resource for Pennsylvania and northeast dairy companies to access dairy export markets. This component of the overall study to support dairy growth and competitiveness examines the historical role of PhilaPort and assesses the impacts if a larger volume of dairy product exports from the mid-Atlantic region would flow through PhilaPort rather than alternatives. The specific objectives of this component include:

- Description of the capacities of PhilaPort that facilitate dairy product exports from Pennsylvania and the northeast region;
- Assessment of the volumes of dairy product exports by US port district, to place PhilaPort into the broader national context;
- Description of dairy product exports from the Philadelphia Port District³ during 2007 to 2016;
- Analysis of the impacts on farm milk prices, milk assembly costs and product distribution costs of increased use of the PhilaPort for dairy product exports based on 2016 volumes.

Capabilities of PhilaPort to Support Dairy Product Exports

The Port of Philadelphia (PhilaPort) has made a number of presentations to meetings organized by the Center for Dairy Excellence that highlight its strong capabilities to support dairy product exports and food product exports more generally. Our analyses draw on this information, which undoubtedly could be complemented with additional information from PhilaPort marketing personnel.

One general advantage for PhilaPort includes its central location, for example, being the closest port location to most dairy processing facilities in Pennsylvania, and shorter rail access from selected US cities. The port has significant capacity for food exports (Figure 1), including facilities (extensive temperature controlled storage capacity and on-dock “reefer plugs” to provide electricity to perishables containers). The port’s labor force is “experienced in the special needs of sensitive, high-value agricultural goods”, and partners with providers who provide high quality support services in transportation, storage and marketing of food products. The port’s staff indicate that it can facilitate access to hundreds of firms that provide cold storage warehousing, food import and brokerage services, freight forwarding and refrigerated trucking.

In March 2017, the port announced major plans for expansion based in part on a \$300 million investment by the Wolf administration. These investments will upgrade ship berths, buy new cranes, and update and relocate warehouses. The activity is expected to double cargo-handling

³ The Philadelphia Port district includes other ports in addition to PhilaPort, extending over a broader geographical area. (See Appendix Table 1.) This broader coverage is considered relevant for the purposes of this analysis, and the majority of export volumes pass through PhilaPort.

space and create 2,000 waterfront jobs, and nearly 7,000 total jobs for truckers, rail workers, suppliers, and port-related businesses. The Port Authority's Board Chairman, Gerard Sweeney, noted the importance and implications of these investments in a March 20, 2017 press release:

"The governor saw a real opportunity to give the port, finally, the right tools so that we could become competitive and market the port to bring business in from other ports, and be in a position for a trans-Pacific line that never would have looked at Philadelphia before because we couldn't handle it."⁴

He indicated that Philadelphia will "now be in the mix with New York, Baltimore, and Norfolk." The port also announced the purchase of additional land in June 2017,

A key component of decision making for shippers of dairy products is accessibility to key export markets through relevant shipping companies. Steamship lines serving PhilaPort include some of the world's largest and best known (for example, Maersk and Hapag-Lloyd), providing services to many regions (Figure 2) although with an emphasis on eastern South America, Central America, Australia and New Zealand⁵.

Many well-known US dairy companies have used PhilaPort for dairy product exports in recent years (Figure 3). The usage of the port, along with its stated capabilities and expansion plans suggests that the port has the capabilities to provide a broad range of services and capacity to support substantial growth in dairy product exports from the state.

⁴ Source: <http://www.philaport.com/port-philadelphia-to-get-new-cranes-bigger-ships-more-cargo-more-jobs/>.

⁵ These routings appear to align reasonably closely with the principal destinations for dairy product exports from the Philadelphia Port District, as will be noted subsequently.



The Port of Philadelphia and Food Cargos

The Greater Philadelphia port complex is one of the leading gateways for food products in the United States. The three-state Port system is a national leader in the importation of perishable goods, receiving about **\$5 billion** in agriculture cargos each year. This includes over **\$2 billion** in fruit imports.

Our Port community is currently benefiting from close to \$1 billion in active or planned infrastructure investments made by public and private entities to enhance the flow of agricultural commerce. Our labor is experienced in the special needs of sensitive, high-value agricultural goods. This commitment to agriculture and prepared foods has resulted in the following successes for the Delaware River Port complex:

- #1 in the USA for importing bananas
- #1 in the USA for importing Chilean fruit
- #1 in the USA for importing Australian meat
- #1 in the USA for importing New Zealand dairy products
- #1 in the USA for cocoa beans
- US leader in meat importation
- Among the nation's leaders for forest products (export and import)
- The Philadelphia Wholesale Produce Market is the largest refrigerated building in the USA; the Market's merchants earn about \$1 billion per year in annual sales.
- Live Pennsylvania cattle are exported from the region

More broadly, the states of Pennsylvania, New Jersey and Delaware have extensive prepared foods industries. Pennsylvania's snack food and confectionery industries alone generate more than \$5.1 billion in sales annually. Food exports are increasing due to the global popularity of high quality, trusted US food products.

Our Philadelphia area supply chain service providers are widely recognized as among the most knowledgeable in the nation concerning the transportation, storage, and sale of food products. Additionally, the University of Pennsylvania's School of Veterinary Medicine and the St. Joseph's University Food Marketing Program are world leaders in their respective fields.

Importing or exporting your food cargos via the Port of Philadelphia is the smart choice. Our location in the heart of a major agriculture and prepared foods center will ensure that your precious food cargos get to market safely and efficiently.

Source: Philadelphia Regional Port Authority Marketing

November 30, 2016

Figure 1. Capabilities of PhilaPort for Food Product Exports and Imports



Figure 2. Steamship Lines Serving PhilaPort

Source: Presentation by J. M. Fox at Center for Dairy Excellence Annual Dairy Financial and Risk Management Conference.

Port Philadelphia Dairy Exports: Leading Companies

KRAFT FOODS BETHLEHEM REEFER	3,745	25.50%
FONTERRA USA	3,099	21.10%
NESTLE USA	2,068	14.08%
GLOBERUNNERS	1,112	7.57%
SEA SHIPPING LINE	644	4.38%
KRAFT FOODS QUAKERTOWN	639	4.35%
KRAFT FOODS WAREHOUSE BETHLEHEM	527	3.59%
HELMSMAN FREIGHT SOLUTIONS	443	3.02%
TRANSNOW	420	2.86%
KRAFT FOODS EXPORTS	210	1.43%

Grand Total: 14,690 Metric Tons

Source: PIERS



Figure 3. Major Dairy Product Exporters Using PhilaPort

Source: Presentation by J. M. Fox at Center for Dairy Excellence Annual Dairy Financial and Risk Management Conference.

Volume of Dairy Product Exports by US Port District

Although PhilaPort has quite substantive resources to support dairy product exports, its current and historical share of overall exports is small relative to other US and mid-Atlantic ports. During the period 2007 to 2016, the value of dairy product exports shipped from the Philadelphia Port District (which includes PhilaPort and other ports) was \$259 million, with \$34 million of that total occurring in 2016 (Table 1)⁶. The Philadelphia Port District ranked 17th of 41 US port districts, and accounted for less than 1% of the value of total US dairy product exports during 2007 to 2016. The five largest US port districts (Los Angeles, San Francisco, Laredo, TX, Seattle, and El Paso, TX) accounted for nearly two-thirds of US dairy product exports during this period. The largest port in the mid-Atlantic region, New York, accounted for about 6% of US dairy product exports during the past decade. The regional share of the Philadelphia Port District is larger than its national share; it accounted for 6% of the value of exports from mid-Atlantic port districts (New York, Norfolk, VA, Baltimore, MD and Washington, DC, which can be considered reasonable competitors with the Philadelphia Port District) during 2016 and 5% during 2007 to 2016.

Although the share of overall exports from the Philadelphia Port District is small compared to other ports, the value of dairy exports from the district has grown considerably since 2007, and at a rate faster than the overall national average (Table 1 and Figure 4) although mirroring overall regional growth in dairy product exports. The share of dairy exports also varies by product, with the Philadelphia Port District having larger shares of ice cream and yogurt than other products during 2016 (Figure 5).

Determining the reasons for the relatively small share of exports from the Philadelphia Port District is beyond the scope of this assessment, but certain factors could be further analyzed. As noted above, PhilaPort has adequate capacity and expertise to handle significantly increased volumes of dairy product exports, has working relationships with key shippers (dairy product companies) and transportation service providers for both in-bound and out-bound shipments, and a similarly favorable location for exports to major export markets compared to other mid-Atlantic region competitors. Factors that could be further explored include relative landed costs to export destinations, shipping schedules and lead times to key export destinations, and institutional arrangements that favor continuation of historical service relationships.

⁶ It is very important to note that these values do NOT indicate the total amount of dairy product manufactured in the state of Pennsylvania that was exported, because not all product produced in Pennsylvania would be exported through the Philadelphia Port District. Similarly, not all dairy products exported from the Philadelphia Port District are manufactured in Pennsylvania. Available data do not, in general, allow detailed analysis of the specific geographical origins of US dairy product exports.

Table 1. Value of Dairy Product Exports and Market Shares by US Port District, 2007 to 2016

Port District	2016 Value of Exports, \$000	% of 2016 Total	2007 to 2016 Total Value of Exports, \$000	% of 2007 to 2016 Total	% Change 2007 to 2016
Anchorage, AK	820	0.0%	13,745	0.0%	271.0%
Baltimore, MD	42,707	0.8%	214,267	0.4%	693.5%
Boston, MA	1,113	0.0%	80,506	0.2%	-89.0%
Buffalo, NY	55,716	1.1%	399,171	0.8%	118.4%
Charleston, SC	32,012	0.6%	330,559	0.7%	79.2%
Charlotte, NC	204	0.0%	7,268	0.0%	55.7%
Chicago, IL	21,942	0.4%	172,476	0.4%	29.9%
Cleveland, OH	2,091	0.0%	11,552	0.0%	343.0%
Columbia-Snake, OR	499	0.0%	235,728	0.5%	-98.9%
Dallas-Fort Worth, TX	14,117	0.3%	49,273	0.1%	2589.0%
Detroit, MI	384,502	7.5%	2,761,559	5.6%	94.3%
Duluth, MN	14,214	0.3%	97,906	0.2%	16.1%
El Paso, TX	452,188	8.9%	3,157,002	6.5%	316.1%
Great Falls, MT	7,970	0.2%	41,941	0.1%	210.7%
Honolulu, HI	4,134	0.1%	15,283	0.0%	6790.0%
Houston-Galveston, TX	90,114	1.8%	1,405,537	2.9%	-28.3%
Laredo, TX	611,923	12.0%	6,959,508	14.2%	-5.8%
Los Angeles, CA	983,245	19.3%	10,912,742	22.3%	93.6%
Miami, FL	237,317	4.6%	1,633,970	3.3%	254.5%
Milwaukee, WI	-	0.0%	1,686	0.0%	-100.0%
Minneapolis, MN	252	0.0%	2,742	0.0%	100.0%
Mobile, AL	6,410	0.1%	67,711	0.1%	-9.1%
New Orleans, LA	5,001	0.1%	39,290	0.1%	25.2%
New York, NY	321,946	6.3%	3,042,757	6.2%	88.4%
Nogales, AZ	7,042	0.1%	83,945	0.2%	2.8%
Norfolk, VA	160,953	3.2%	1,709,434	3.5%	48.0%
Ogdensburg, NY	64,542	1.3%	567,379	1.2%	73.1%
Pembina, ND	70,289	1.4%	448,145	0.9%	316.3%
Philadelphia, PA	34,519	0.7%	259,211	0.5%	346.2%
Portland, ME	1,641	0.0%	17,321	0.0%	152.1%
San Diego, CA	160,205	3.1%	1,084,140	2.2%	101.0%
San Francisco, CA	654,619	12.8%	6,480,620	13.2%	104.9%

Port District	2016 Value of Exports, \$000	% of 2016 Total	2007 to 2016 Total Value of Exports, \$000	% of 2007 to 2016 Total	% Change 2007 to 2016
San Juan, PR	12,115	0.2%	86,083	0.2%	1221.2%
Savannah, GA	88,993	1.7%	432,661	0.9%	1039.9%
Seattle, WA	486,170	9.5%	5,613,545	11.5%	12.3%
St. Albans, VT	31,282	0.6%	242,437	0.5%	48.9%
Tampa, FL	11,045	0.2%	127,406	0.3%	57.0%
Washington, DC	498	0.0%	5,236	0.0%	344.6%
Total	5,103,758	100.0%	48,925,370	100.0%	68.4%
Philadelphia Total	34,519		259,211		
Philadelphia Share	0.68%		0.53%		
Mid-Atlantic Ports ^a	560,623		5,230,905		
Philadelphia Share	6.16%		4.96%		

Source: Calculations from US Census Bureau data, accessed through the US International Trade Commission Dataweb (https://dataweb.usitc.gov/scripts/user_set.asp).

^a For the purposes of this analysis, mid-Atlantic ports include New York, Norfolk, VA; Baltimore, MD; and Washington, DC in addition to Philadelphia.

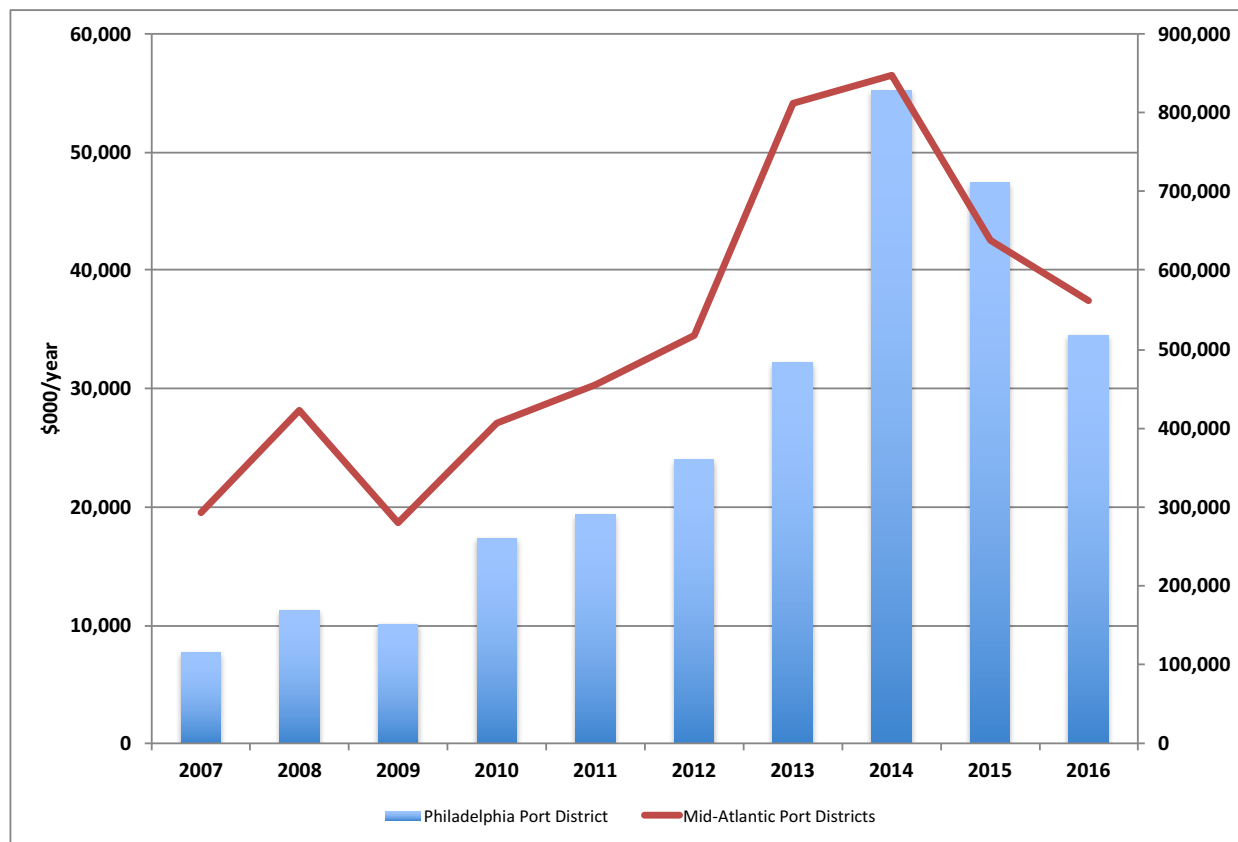


Figure 4. Value of Dairy Product Exports from Philadelphia Port District (Left Axis) and Mid-Atlantic Port Districts (Right Axis), 2007 to 2016

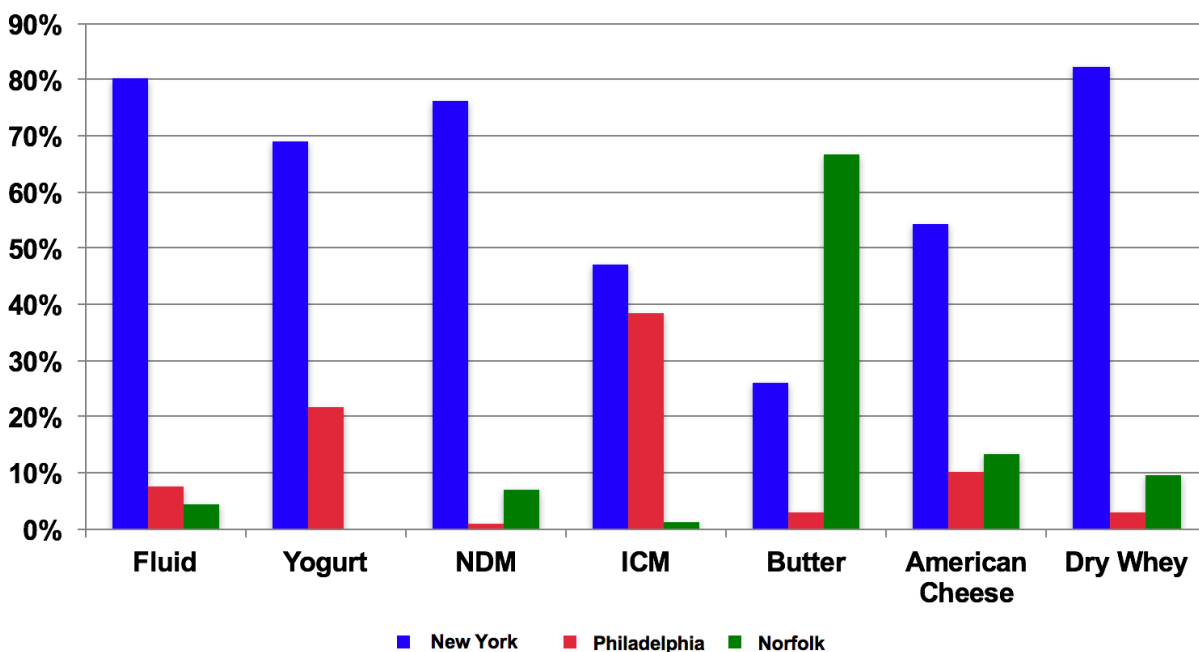


Figure 5. Share of 2016 Export Volume, Selected Dairy Products, Three Mid-Atlantic Port Districts

Descriptive Analysis of Dairy Product Exports from the Philadelphia Port District

A diverse set of products was exported through the Philadelphia Port District during the past decade (Table 2), to more than 80 different country destinations. The largest value shares of exports from the port were for ice cream, protein concentrates (both those in chapter 21 of the Harmonized Tariff Schedule (HTS) and in chapter 4), and fresh, processed and other cheeses. The growth rates of exports for these products has been impressive during the past decade, reflecting in part the growing role of the US as a dairy exporter.

The product mix exported from the Philadelphia Port District differs somewhat from that exported by the US overall. Ice cream product exports from the Philadelphia Port District accounted for one-third of the total export value during 2016, compared to only about 4% for the US as a whole⁷ (Figure 6). The Philadelphia Port District also exported a larger share of processed cheese than the US, more than 10% of total value compared to less than 2% for the US overall. The five product categories in Figure 6 accounted for more than three-quarters of the value of exports from the Philadelphia Port District in 2016, but only about one-third of the total value of US exports. Product categories that were important for the US overall that are under-represented in Philadelphia Port District exports include milk powders and whey products. These products accounted for more than 35% of total US exports (by value) in 2016, but only about 5% of exports from the Philadelphia Port District. These differences in product mix undoubtedly represent the outcomes of differences in both regional production, proximity to export markets, and investments in export market relationships by dairy product companies. (It is important to note that the above does NOT imply the extent to which these products were manufactured in and “exported” from Pennsylvania because not all product originating in Pennsylvania was exported through the Philadelphia Port District, and not all product exported from the Philadelphia Port District was manufactured in Pennsylvania.)

The key export destinations for dairy products exported from the Philadelphia Port District include, perhaps unexpectedly, Australia and New Zealand (Table 3)⁸. These two countries accounted for close to half of the value of exports from the Philadelphia Port District during 2007 to 2016, although only 40% in 2016 (and most in this year to Australia). Most of the other key export destinations (other than the Netherlands) are in Central or South America. The share of exports to the most important destinations from the Philadelphia Port District differs quite a bit from the share of exports to these destinations from the US as a whole (Figure 7). Notably absent from the destinations served by the Philadelphia Port District in 2016 were nine of the top ten US export destinations (Mexico, Canada, China, Korea, Philippines, Japan, Indonesia, Vietnam and Taiwan) although PhilaPort’s ability to serve those markets will likely be

⁷ One reason PhilaPort is strong in ice cream exports is its general strength in frozen food imports, which facilitates outbound frozen food shipments. PhilaPort is the largest port in the USA for Australian meat imports; it maintains 13 USDA certified meat re-inspection warehouses for imported meat, compared to only 3 such facilities for the port of North Jersey / New York. This gives PhilaPort a large amount of freezer warehouse capacity which is essential for ice cream exports.

⁸ PhilaPort exports dairy products to Australia and New Zealand because the port imports large quantities of meat and dairy products from those countries, so returning ships are sailing back with a lot of empty space.

strengthened in the near future⁹. (Again, this does not mean that product from Pennsylvania did not reach these export markets, just that any product that did was not shipped through the Philadelphia Port District.)

The products shipped to each of the top ten export destinations from the Philadelphia Port District vary. The most important destinations for ice cream in 2016 were Australia, Brazil and Bermuda (Table 4). Chile was the largest destination for fresh cheese, and Bermuda the largest destination for other cheese. The largest destination for processed cheese was Australia, and the largest destinations for protein concentrates (chapter 26 of HTS) were the Netherlands and Colombia. These results suggest that relatively few export destinations account for the majority of product value shipped from the Philadelphia Port District in a given year—63% of total 2016 value is represented by the country-product combinations mentioned in this paragraph.

This pattern that a relatively small number of country-product combinations accounts for a majority of the value of dairy product exports also applies to the value of exports from 2007 to 2016. The five largest export products by value during this time were ice cream, other cheese, protein concentrates (chapter 26 HTS), processed cheese and MPC, which together accounted for 65% of the export value from the Philadelphia Port District. Exports to Australia and Bermuda accounted for more than 50% of total value during this decade. These two countries accounted for 97% of other cheese exports, 80% of processed cheese exports and (with Brazil also) 98% of ice cream exports. New Zealand was the destination for 99% of MPCs exported from the Philadelphia Port District during these 10 years, and was also a major destination for protein concentrates (chapter 21 HTS). When combined with Australia, Colombia and the Netherlands, these four countries accounted for 96% of the value of protein concentrate exports. Overall, the 12 country-product combinations described above accounted for 62% of the value of exports from the Philadelphia Port District from 2007 to 2016.

In sum, the Philadelphia Port District served as the export location for a wide variety of products that were shipped to 86 different destinations during 2007 to 2016. This suggests that expansion of export value is possible, although historically the exports have been concentrated on a relatively small number of country-product combinations. The destinations served by the Philadelphia Port District have not necessary been among the most important or fastest growing, nor do the products exported represent those exported by the US overall. The extent to which these present constraints on future growth of dairy exports from the District might be usefully considered.

⁹ PhilaPort expects to get an Asian service once their Port Development Plan is completed, with the construction to be finished in the next 2 years or so. This should give PhilaPort access to many of the major export markets mentioned above (Personal communication, Dominic O'Brien, Senior Marketing Representative for PhilaPort).

Table 2. Value of Dairy Product Exports from the Philadelphia Port District, 2007 to 2016, by Product

HTS Number	Short Description	2016 Value of Exports, \$000	% of 2016 Total	2007-2016 Value of Exports, \$000	% of 2007 to 2016 Total	% Change 2007 to 2016
040110	Milk & Cream, < 1%	61	0.2%	86	0.0%	a
040120	Milk & Cream, 1-6%	0	0.0%	29	0.0%	-100.0%
040140	Milk & Cream, 6-10%	0	0.0%	4	0.0%	a
040210	NDM/SMP	343	1.0%	6,645	2.4%	-44.9%
040221	WMP	223	0.6%	9,778	3.6%	-86.5%
040229	WMP, Sweetened	3	0.0%	832	0.3%	-98.2%
040291	Concentrated Milk	145	0.4%	433	0.2%	a
040299	Sweetened Concentrated Milk	54	0.2%	865	0.3%	38.5%
040310	Yogurt	290	0.8%	1,031	0.4%	9566.7%
040390	Buttermilk	3	0.0%	481	0.2%	-99.2%
040410	Whey Products	1,403	4.1%	20,694	7.6%	6.7%
040490	MPC Low	36	0.1%	24,800	9.1%	1100.0%
040510	Butter	99	0.3%	11,039	4.1%	-97.9%
040520	Dairy Spreads	83	0.2%	778	0.3%	176.7%
040590	Fats/Oils/AMF	11	0.0%	1,163	0.4%	-95.2%
040610	Cheese, Fresh	3,205	9.3%	19,934	7.3%	12720.0%
040620	Grated/Powdered Cheese	1,626	4.7%	11,368	4.2%	194.6%
040630	Processed Cheese	3,920	11.4%	28,145	10.3%	566.7%
040640	Blue-veined Cheese	1,198	3.5%	2,026	0.7%	a
040690	Other Cheese	1,746	5.1%	31,540	11.6%	19.6%
170211	Lactose	76	0.2%	3,304	1.2%	a
170219	Lactose NESOI	52	0.2%	395	0.1%	333.3%
190110	Infant Formula	1,065	3.1%	3,294	1.2%	8775.0%
210500	Ice Cream	11,394	33.0%	47,741	17.6%	3136.9%
210610	Protein Concentrates	6,443	18.7%	40,354	14.8%	2776.3%
350110	Casein	816	2.4%	1,464	0.5%	a
350190	Caseinates	0	0.0%	468	0.2%	a
350220	MPC High	240	0.7%	3,320	1.2%	a
	Total	34,535	100.0%	272,011	100.0%	180.6%

^a No % change value calculated because 2007 value equals zero.

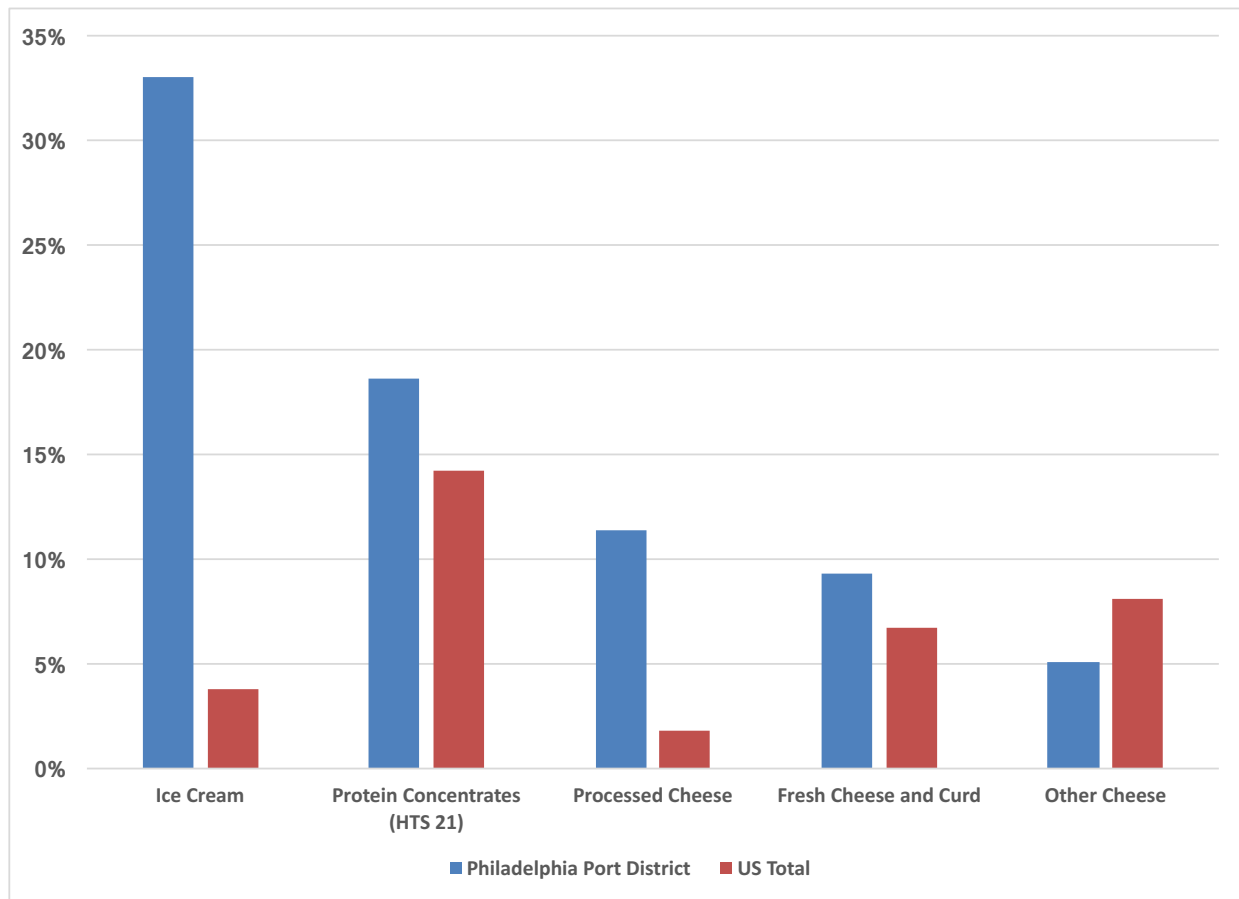


Figure 6. Share of Export Value for Philadelphia Port District and Total US, by Top Five Products Exported, 2016

Table 3. Value of Dairy Product Exports from the Philadelphia Port District, 2007 to 2016, by Top 10 Destination Countries

Country	2016 Export Value, \$000	% of 2016 Total	2007- 2016 Total Export Value, \$000	% of 2007 to 2016 Total	% Change 2007 to 2016	Maximum % of Exports During 2007 to 2016	Maxi- mum % Exports Year
Australia	12,803	37.1%	81,240	29.9%	12832%	37.1%	2016
New Zealand	765	2.2%	44,302	16.3%	-83%	36.8%	2007
Bermuda	3,192	9.2%	29,060	10.7%	26%	20.7%	2007
Costa Rica	1,906	5.5%	13,973	5.1%	89%	10.7%	2009
Honduras	631	1.8%	13,310	4.9%	38%	13.2%	2009
Colombia	1,874	5.4%	8,830	3.2%	a	7.6%	2015
Chile	1,489	4.3%	8,023	2.9%	1631%	5.8%	2012
El Salvador	897	2.6%	7,200	2.6%	30%	10.6%	2008
Netherlands	1,667	4.8%	7,180	2.6%	2825%	5.4%	2013
Brazil	4,039	11.7%	6,220	2.3%	a	11.7%	2013

^a No % change value calculated because 2007 value equals zero.

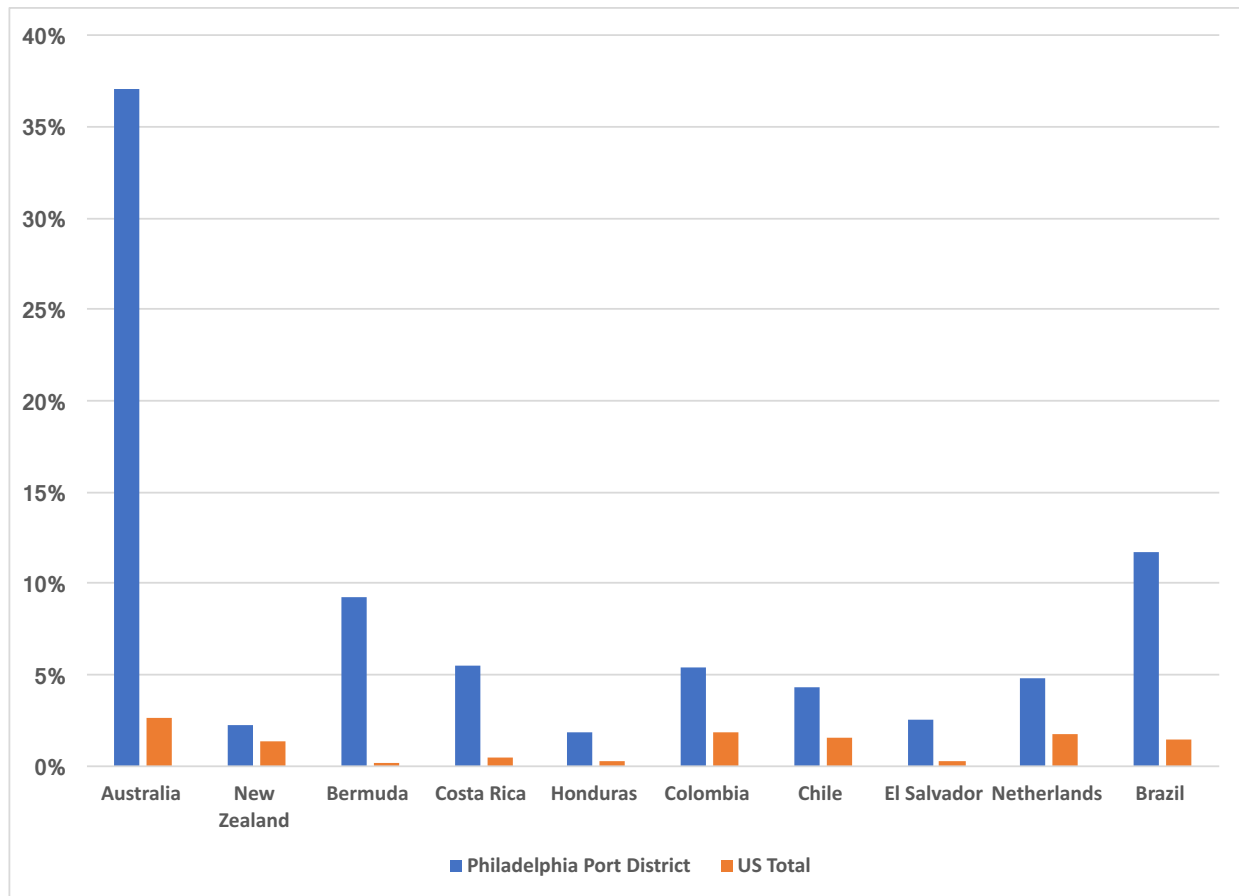


Figure 7. Share of Export Value for Philadelphia Port District and Total US, by Top Ten Export Destinations, 2016

Table 4. Value of Dairy Product Exports from the Philadelphia Port District, 2016, by Product and Top 10 Destination Countries, \$000

Product	Australia	Bermuda	Brazil	Chile	Colombia	Costa Rica	El Salvador	Honduras	Netherlands	New Zealand	Total
Blue-veined Cheese	1,198					0					1,198
Butter		17	0						0	0	17
Buttermilk		0									0
Casein	811		0						0		811
Caseinates	0	0							0		0
Cheese, Fresh	300	212		1,332		438	197	313		248	3,040
Concentrated Milk		46					99	0			145
Dairy Spreads		83				0					83
Fats/Oils/AMF		8				0		0			8
Grated/Powdered Cheese	1,186	415		0	0	0		0	0	0	1,601
Ice Cream	5,670	625	3,945	0	59	0		88	0	0	10,387
Infant Formula	0	16	94		213	120	30	117	22		612
Lactose	76			0	0					0	76
Lactose NESOI	52	0	0	0		0				0	52
Milk & Cream, < 1%							51				51
Milk & Cream, 1-6%		0									0
MPC High	0			0		240				0	240
MPC Low	0	0		0	0	0		33		0	33
NDM	0	57		0	202	4	50	19			332
Other Cheese	393	974		0	0	0	0			0	1,367
Processed Cheese	2,981	334		0	0	415		0			3,730
Protein Concentrates	23	20		157	1,347	0		42	1,636	517	3,742
Sweetened Concentrated Milk		54						0			54

Product	Australia	Bermuda	Brazil	Chile	Colombia	Costa Rica	El Salvador	Honduras	Netherlands	New Zealand	Total
Whey Products	113	38		0	0	689	470	19	9	0	1,338
WMP	0	6		0	53	0	0	0			59
Yogurt	0	287									287
Total	12,803	3,192	4,039	1,489	1,874	1,906	897	631	1,667	765	29,263

Table 5. Value of Dairy Product Exports from the Philadelphia Port District, 2007 to 2016, by Product and Top 10 Destination Countries, \$000

Product	Australia	Bermuda	Brazil	Chile	Colombia	Costa Rica	El Salvador	Honduras	Netherlands	New Zealand	Total
Blue-veined Cheese	2,012					10					2,022
Butter		539	4						3	4,304	4,850
Buttermilk		360									360
Casein	811		393						16		1,220
Caseinates	4	8							3		15
Cheese, Fresh	1,614	1,394		5,995		770	634	5,065		2,108	17,580
Concentrated Milk		249					99	58			406
Dairy Spreads		751				22					773
Fats/Oils/AMF		8				47		529			584
Grated/Powdered Cheese	4,820	2,421		7	16	1,135		971	29	346	9,745
Ice Cream	31,958	5,241	5,701	122	122	18		564	27	71	43,824
Infant Formula	27	227	94		870	146	30	117	177		1,688
Lactose	142			208	179					2,614	3,143
Lactose NESOI	121	3	28	34		3				86	275
Milk & Cream, < 1%							51				51
Milk & Cream, 1-6%		11									11
MPC High	331			49		2,884				56	3,320
MPC Low	23	4		38	26	106		33		23,822	24,052
NDM	1,022	182		156	276	4	417	32			2,089
Other Cheese	13,571	12,594		555	91	204	31			56	27,102
Processed Cheese	12,923	3,309		12	29	1,454		2,751			20,478
Protein Concentrates	4,133	249		738	7,090	34		42	6,900	7,299	26,485
Sweetened Concentrated Milk		404						341			745

Product	Australia	Bermuda	Brazil	Chile	Colombia	Costa Rica	El Salvador	Honduras	Netherlands	New Zealand	Total
Whey Products	1,947	161		67	52	7,099	4,753	2,633	25	1,759	18,496
WMP	5,776	17		42	79	37	1,185	174			7,310
Yogurt	5	928									933
Total	81,240	29,060	6,220	8,023	8,830	13,973	7,200	13,310	7,180	42,521	217,557

Analysis of Selected Economic Impacts of Expanded Dairy Product Exports Through PhilaPort

Given the interest in facilitating dairy product exports from Pennsylvania and the investments made by PhilaPort in infrastructure and marketing, it is relevant to consider the economic impacts of increases in dairy product exports through the port¹⁰. In principle, it would be appropriate to develop and analyze alternative scenarios for future export growth and to assess their economic impact¹¹. In practice, we opt for a simpler approach that uses a spatial economic model¹² to assess the impacts of reallocating export shipments from other mid-Atlantic ports to PhilaPort based on data from March and September 2016. The spatial model currently uses actual export volumes by port district as export demand in these two months. To assess the impact of increased dairy product exports through PhilaPort, we assume that the entire volume of exports other from mid-Atlantic ports (New York, Baltimore, Washington, DC and Norfolk) is allocated as export demand to PhilaPort—and the volumes shipped from these other mid-Atlantic ports is set equal to zero. (Figure 8 depicts the scenario graphically.) Although this is an extreme and rather unrealistic scenario (and other less extreme reallocations could easily be envisioned), it was selected to illustrate the maximum possible impact of reallocation of export demand from other ports to PhilaPort. The model does not indicate how this reallocation would be achieved, nor do the results illustrate the impacts of general growth in exports.

We examine the impact that reallocation of export demand to PhilaPort has on milk assembly costs, and regional milk location values (which can be thought of as location-related or market premiums), on total milk processed and product volumes in Pennsylvania, and on product distribution costs (from processors to customers) in March and September 2016. Together these values provide a partial estimate of the economic benefits of greater use of PhilaPort compared to alternative export locations. We do not include in this analysis an estimate of economic multiplier effects on overall economic activity and employment in Pennsylvania, although these benefits could also be important.

Results

Increased use of PhilaPort during March and September 2016 would have increased farm milk values, reduced farm milk assembly costs, decreased product distribution costs, and modified to some extent the state's dairy product manufacturing mix (Table 6). Farm milk values would be increased by about \$1.1 million per year (about \$0.01/cwt for all Pennsylvania milk), and farm

¹⁰ Please note that this is different than assessing how exports through PhilaPort (or from Pennsylvania more generally) might be increased, outcomes which depend on overall growth in exports from the region and the benefits of PhilaPort use relative to other port facilities, not assessed in this report.

¹¹ Future export growth for major product categories will be assessed as one component of this study, but for the US as a whole, not for specific ports. However, overall growth in exports tends to be associated with increases in exports from the Philadelphia Port District.

¹² The model is described in detail in the component of this report assessing the economic impact of additional processing capacity in Pennsylvania. As noted there, the United States Dairy Sector Simulator (USDSS) has a twenty-year history of development, and has been used in the assessment of spatial pricing surfaces for Class I milk, impacts of dairy plant closures, assessment of the potential for and impacts of localization of dairy supply chains, and the optimal locations for new processing capacity.

milk assembly costs would decrease by about \$320,000¹³. Product distribution costs would also be reduced by about \$320,000. The net benefit of a large re-allocation of dairy product exports from other mid-Atlantic ports to PhilaPort would be about \$1.8 million per year, or about \$0.02/cwt for all Pennsylvania milk. This represents that maximum benefit that might be achieved through re-allocation alone.

Use of PhilaPort for all mid-Atlantic exports would also provide incentives for re-allocation of milk produced in Pennsylvania¹⁴. Somewhat more milk would be shipped out of the state (7.5 million lbs per year—about 0.1% of total annual milk production) primarily to Delaware, close to the port. The reallocation would provide incentives for additional production of ice cream, dry whey, fluid milk, and evaporated/condensed/dried products in Pennsylvania, and reductions in the state's butter, cottage cheese, NDM and other cheese.

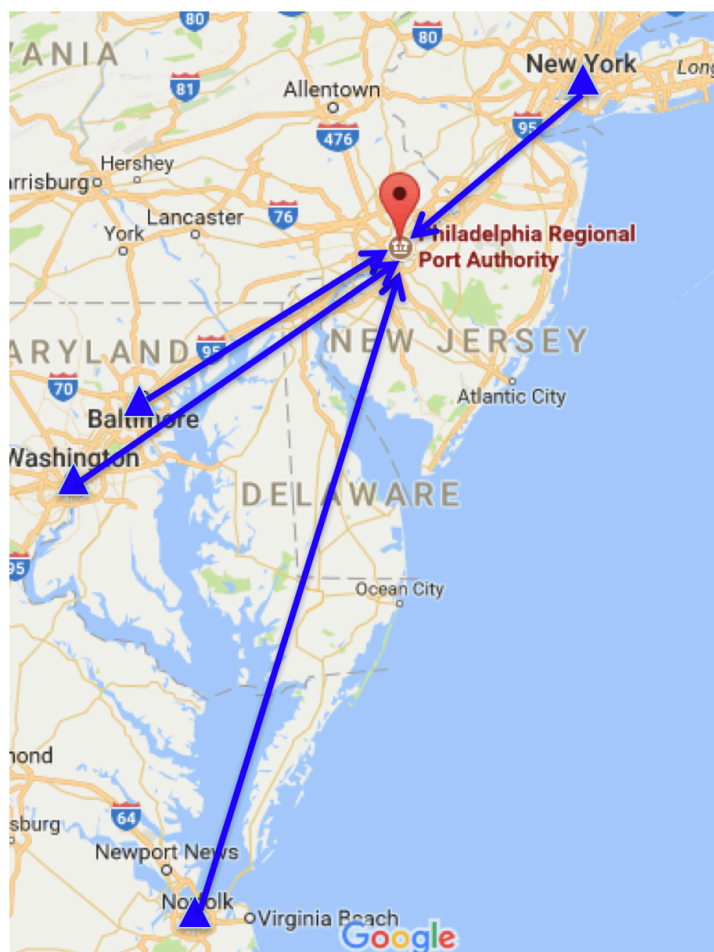


Figure 8. Graphical Depiction of Spatial Economic Analysis Re-Allocating 2016 Dairy Product Exports from Mid-Atlantic Ports to PhilaPort

¹³ These aggregated values are relevant, but the effects differ somewhat for different locations in the state—farms closer to PhilaPort would see a larger share of these benefits.

¹⁴ The USDSS determines the spatial organization of the US dairy industry minimizes the costs of milk assembly, processing (including inter-plant product transfers) and distribution for the US as a whole. Changes to the location of export demand thus can affect the least-cost location for processing of dairy production, milk assembly to plants and distribution routes.

Table 6. Estimated Economic Impacts of Increased Exports of Dairy Products from PhilaPort, March and September 2016 Export Volumes

Impact of Increased PhilaPort Exports	March^a	September^a	Annual Average^b
Change in milk processed in PA, mil lbs	-0.1	-1.2	-7.5
Change in production, mil lbs			
Butter	-0.1	-0.2	-2.1
Cheese	0.0	0.0	0.0
Cottage Cheese	0.0	-0.1	-1.1
Dried Buttermilk	0.0	0.0	0.0
Dry Whey	0.3	0.8	6.4
Evaporated Condensed Dried	0.4	0.4	4.6
Fluid	0.2	0.2	2.4
Greek Yogurt, Thickened	0.0	0.0	-0.1
Ice Cream	1.0	0.2	7.3
NDM	-0.1	0.0	-0.6
Other Cheese	0.0	-0.1	-0.4
Yogurt	0.0	0.0	0.0
Impact on Farm Milk Value, \$/cwt	0.01	0.01	0.01
Change in Farm Milk Value, \$	80,268	109,932	1,141,200
Change in Total Farm Milk Assembly Costs, \$	-1,812	-51,205	-318,102
Change in Product Distribution Costs, \$	-12,451	-40,445	-317,376
Net Benefit, \$	94,531	201,582	1,776,678
Net Benefit, \$/cwt	0.01	0.02	0.02

^a Indicates values per month (other than values per cwt)

^b Indicates values per year (other than values per cwt). Estimated as the average of the March and September values times 12.

Implications and Limitations

The foregoing suggests that the Philadelphia Port District and PhilaPort more specifically have significant experience in the export of a wide range of dairy products to a diverse set of countries. Although the current market share for the Port District is small compared to other mid-Atlantic ports and major dairy export locations, it has a notable share of ice cream exports and apparent potential for future growth for a variety of product categories. The limited shipments during the past decade from the Philadelphia Port District to major and more rapidly-growing export markets (Mexico, Canada, China and other Asian countries) may affect the ability of the port to grow export market share—if not the total volume of exports—in coming years, although the port is making investments to expand its capacity to serve those markets. Growth in export market share for PhilaPort would have positive impacts for Pennsylvania farmers and processors, but are probably modest under realistic scenarios.

This analysis is limited in the sense of not fully exploring the reasons underlying the current small market share and the product mix that differs from that of the US as a whole. Factors that likely affect this include, as previously noted, relative landed costs to export destinations, shipping schedules and lead times to key export destinations, and institutional arrangements between dairy companies, shipping lines and buyers. We also do not, in this analysis, project future US exports, which would affect the opportunities for additional volumes to be shipped from PhilaPort, although subsequent analyses will provide an assessment of likely export growth for the US as a whole. Our assessment of the economic impacts is limited in that it considers only re-allocation of export demand for two months in one year, but is suggestive of the magnitude of benefits that could accrue to the Pennsylvania dairy industry if greater use were made of PhilaPort for dairy exports—which is different than the impacts of growth in export demand overall.

Appendix Table 1. Ports Included in the Philadelphia Port District

Code	Port in District
1101	PHILADELPHIA, PA
1102	CHESTER, PA
1103	WILMINGTON, DE
1104	PITTSBURGH, PA
1105	PAULSBORO, NJ
1106	WILKES-BARRE/SCRANTON, PA
1107	CAMDEN, NJ
1108	PHILADELPHIA INTERNATIONAL AIRPORT, PA
1109	HARRISBURG, PA
1113	GLOUCESTER CITY, NJ
1119	ALLENTOWN, PA (LEHIGH VALLEY INTERNATIONAL AIRPORT)
1182	ATLANTIC CITY REGIONAL AIRPORT, NJ
1183	TRENTON/MERCER COUNTY AIRPORT, NJ
1195	UPS, PHILADELPHIA, PA

Source: US Bureau of the Census, <https://www.census.gov/foreign-trade/schedules/d/dist.txt>