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Dairy Outlook

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OUTLOOK FOR U.S. DAIRY

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The U.S. dairy sector entered 2021 still in flux following the extraordinary events brought about by the COVID-19 pandemic. As the virus mutated into its variants, the economic shock stemming from the first year of reacting to the pandemic reverberated throughout 2021. There were labor issues, logistical challenges and rising inflation. COVID cases and quarantine requirements caused labor deficiencies in dairy manufacturing plants, where some plants had to forego production runs due to inadequate staffing. The labor issues factored in the difficulties in the trucking industry and at the ports, which contributed to the rising freight rates and logistical challenges. The congested dynamics at the ports and in transit hindered efforts by dairy exporters. Rising costs of inputs countered the increase in milk and dairy product prices, impacting producer and manufacturer margins.

Thus, doing business in 2021 was complicated and challenging. Yet in the face of uncertainty and turmoil in the economy, the dairy industry succeeded in providing ample dairy products to domestic and world markets. The dairy farm sector showed productivity growth in 2021--milk production of 226.3[1] billion pounds increased by 1.6 percent following a remarkable 1.9 percent growth in 2020 (percentages adjusted for leap year).

U.S. consumption of milk fat continued on its upward trajectory in 2021 as measured by the amount of farm ("raw") milk needed to provide the fat in the various products consumed in the U.S. (referred to as the "milk-equivalent, milk-fat basis"). Except for September and October 2021, domestic consumption on a milk-fat basis was higher each month compared to the same month in 2020, a total increase of 4.0 billion pounds over 2020. In contrast, domestic use of skim solids increased just 0.2 billion pounds in 2021, as measured by the milk equivalent, skim-solids basis.

Despite the snarls at the ports, commercial exports increased in 2021 (2.3 billion pounds, 24.7 percent, on a milk-fat basis and 3.9 billion pounds, 8.3 percent, on a skim-solids basis). USDA/Agricultural Marketing Service (AMS) Dairy Program Grading Services Branch issued 62,000 export certificates (a 13 percent increase over 2020) to 126 countries to help facilitate the $7.7 billion of dairy product exports in 2021. U.S. -produced milk components were exported in various forms to every continent of earth and to over 150 different countries. While exports increased substantially from 2020 to 2021, they would likely have been higher without lost sales due to additional costs to exporters and delays in shipping schedules.

[1] This does not reflect any revisions published in the USDA/National Agricultural Statistics Service (NASS) February 23 *Milk Production* report.

The month-to-month variation of average prices for cheese (and to a lesser extent, butter and nonfat dry milk) settled down somewhat in 2021 compared to 2020. Average prices for butter, non-fat dry milk and whey rose in 2021, averaging 15, 23, and 21 cents higher than 2020, respectively. However, cheese prices averaged 25 cents lower. The keywords of this forum, "Sustainability, Productivity Growth," have been exemplified by the U.S. dairy industry as it adapted to difficulties arising from a variety of arenas.

Outlook for 2022: Slower Worldwide Milk Supply Growth

Growth in milk supplies of the world's major exporting countries (European Union-27 countries, the U.S., New Zealand, Argentina and Australia) slowed in the second half of 2021 and contracted in the fourth quarter of 2021. Slow growth is presumed to persist in 2022 as the sector works though global supply chain and pandemic constraints. The major exporting countries of the European Union and New Zealand are each expected to grow by less than 1 percent[2], as they face inflated costs and increased environmental regulations which are likely to put downward pressure on cow numbers in both areas (USDA/FAS). Weather-related issues affected both New Zealand and Australia's 2021-22 milk production seasons. Expectations are for slow growth in U.S. milk production also to 227.2 billion pounds in 2022, just 0.4 percent growth.

Contributing to the slowdown in U.S. milk production growth is the drop in cow numbers. On January 1, 2022, the surveyed inventory of 9.375 million milk cows was 0.7 percent lower than the 9.442 million on January 1, 2021. The average number of milk cows in December 2021 was about the same as August 2020 (9.375 v. 9.374 million head). Expectations are for continued, moderate decline in numbers through 2022 for an annual average of 9.36 million head, down 88,000 head from the 2021 average of 9.448 million. The January 1, 2022, USDA/NASS *Cattle* report shows tightness in dairy cow replacement availability. The ratio of dairy heifers expected to calve to milk cows was 47.5 percent, the lowest since 2009, and down from 48.8 percent in 2021. (From 2010 through 2020 there was more than 1 heifer for every 2 milk cows at the beginning of the year, peaking at 51.7 percent for January 1, 2016.)

Prices in 2022 for feed items are expected to be high relative to 2021, which also had high prices relative to the year prior. With tighter milk supplies and total use of dairy products (domestic use plus exports) growing 0.1 and 0.4 percent respectively (on a milkfat and skim-solids basis), milk prices are expected to improve in 2022. The higher milk prices expected in 2022, are likely to offset the higher feed prices and improve the dairy farmer milk income-over-feed cost outlook over 2021.

Dairy producers will likely continue to face higher production costs, such as freight, fuel, fertilizer, rents, and other inputs, as well as feed, that will squeeze margins through much of the year. Labor availability and costs are also ongoing issues on farms. With rising inflation, in real dollars, the rising milk prices may be more than offset by the higher input costs. Expected

[2] Projections for export growth are taken from the December report, Dairy: World Markets and Trade, published by USDA, Foreign Agricultural Service.

inflation is likely to erode real margins throughout 2022. These factors combine to likely keep the brakes on the dairy herd expansion in 2022.

Output per cow is expected to increase 1.3 percent in 2022, with the larger year-over-year gains coming in the second half of 2022. High feed prices are expected to put downward pressure on the improvement in yield per cow in the first quarter of 2022.The second-half year-over-year gains reflect in part, the weather-related lowered production in late summer 2021.

Component levels in milk are expected to continue their upward pattern in 2022. As a result, total production of U.S. milk solids is expected to be more than the 0.4 percent growth in projected U.S. milk production.

2022 Imports and Exports

Higher U.S. butter prices are expected to attract additional imports in 2022 as they converge with international price levels. Strong demand for premium butter and to a lesser extent, the lifting of import tariffs in early 2021 are also contributing factors. Compared to 2021, 0.4 billion pounds more imports on a milk-fat basis are expected, totaling 6.9 billion pounds. Conversely, on a skim-solids basis, imports in 2022 are expected to be 0.1 billion pounds lower, totaling 5.7 billion pounds, despite rising prices for non-fat dry milk and whey. This is due to lower domestic nonfat dry milk and whey prices relative to international prices expected in 2022.

Likewise, the relatively high U.S. prices for products high in milk-fat content are expected to result in 0.6 billion pounds fewer exports on a milk-fat basis to 11.0 billion pounds. Exports on a skim-solids basis are expected to be up slightly from 2021, 0.1 billion pounds to 51.2 billion pounds. High nonfat dry milk and whey prices relative to international prices will likely limit export growth in 2022. Relief in port congestion is an unknown for 2022 and may continue to be an ongoing factor during the year.

Growth in Domestic Use Lackluster

Domestic demand for dairy products may be hampered by inflation, variation in disposable income, and continued fluctuation in food service demand as COVID variants cause ebb and flows in restaurant and food-away-from-home. Higher retail prices in 2022 are likely to constrain demand growth. Domestic use in 2022 is forecast to increase 0.8 billion pounds on a milk-fat basis to 222.2 billion pounds and 0.9 billion pounds to 180.8 billion pounds on a skim-solids basis.

Combining modest growth in domestic use, measured milk production growth, and the expected trade patterns in 2022, commercial ending stocks are expected to decline 0.3 billion pounds to 14.1 billion in 2022 on a milk-fat basis. The highest level of ending stocks on a milk-fat basis was in 2020 (15.6 billion pounds). On a skim-solids basis, ending stocks are forecast at 10.6 billion (down 0.2 billion pounds). The highest commercial ending stocks (not including government-held) on a skim-solids basis were seen in 2017 at 11.8 billion pounds.

Dairy Product Prices to strengthen in 2022
In 2022, dairy product production is likely to face issues carrying over from 2021 in various sectors such as packaging materials, labor, warehouse space, and transportation. USDA projects prices reflective of the AMS-reported average prices for butter, nonfat dry milk cheese and whey that are used in Federal Milk Marketing Order milk price formulas.

Butter
Total butter supplies (beginning stocks, production, and imports) followed the typical seasonal pattern, but dropped below 2020 levels in the last 4 months of 2021, from 561.7 million pounds in September to 400.5 million pounds in December. Troubles with staffing due to covid cases meant some butter plants had to forgo some production runs (2021 monthly butter production was below same month in 2020 for every month July to December, where December butter production was down 13.2 percent). This, along with slow growth in milk production as cow numbers fell, led to declining butter supplies as 2021 progressed. Hence, we saw sharp price increases in butter prices in November and December 2021, continuing in January 2022.

With tight world butter supplies and U.S. prices that were below the export prices for Oceania and Western Europe butter, opportunities arose for U.S. exporters of butter. U.S. prices for butter in 2021 averaged 59 and 55 cents per pound below the USDA/AMS *Dairy Market News* reported export prices for Oceania and Western Europe, respectively. In 2021, the U.S. exported over twice as much butter as in 2020, 98.3 million pounds and well-above all previous years since 2014. Note however, that exports of butter are a small volume relative to domestic use (4.4 percent of total disappearance in 2021). Domestic use of butter also continued apace through 2021 (2.1 billion pounds, an increase of 2.4 percent over 2020). Domestic use in December 2021 was 193.8 million pounds, below November but above December 2020 by 6.3 percent.

Butter prices in 2022 are expected to average $2.39 per pound, 66 cents higher than 2021. They are expected to decline gradually both domestically and internationally. Forecast U.S. prices are expected to be below, but close to, Oceania butter prices.

Dry Skim Milk Products
Declining world production of dry skim milk products[3] along with strong demand throughout the pandemic has put a persistent squeeze on dry skim milk markets. Prices for Oceania skim milk powder were well-above U.S. nonfat dry milk prices (as reported in the AMS/USDA *National Dairy Products Sales Reports*) the first half of 2021. Export prices for skim milk powder in Oceania and Western Europe averaged 26 and 15 cents per pound, respectively above U.S. nonfat dry milk prices in 2021. This created export opportunities for U.S. dry skim milk powders in 2021 despite ongoing port congestion and elevated freight rates, and exports increased 10.2 percent over 2020 to 2.0 billion pounds. Exports of dry skim milk products in 2021 represented the highest share (74.7 percent) of their total commercial use since at least 1995. While the high world prices pulled 0.2 billion more pounds of U.S. dry skim milk products to destinations around the world compared to 2020, the high domestic prices contributed to lower U.S. domestic use by a similar amount to 665.5 million pounds, the lowest level since prior to 1995. Production of dry

[3] Dry skim milk products include nonfat dry milk, skim milk powder, and dry skim milk for animal use.

skim milk products declined in the second half of 2021 leading to lower ending stocks. Stocks to total commercial use for the first half of 2021 averaged 49 days and declined to 36 days on average for the second half.

U.S. prices of nonfat dry milk are expected to continue to rise in the first quarter of 2022 because the dampened world supply situation is expected to persist until the Oceania 2022/23 season comes on mid-year 2022. Prices should then ease somewhat, but the margin between Oceania and Western European skim milk powder prices and U.S. nonfat dry milk prices is expected to narrow. One question is what impact the problems and freight charges through the ports and shipping channels are having on pricing relative to export competitors and ability to get product overseas, and how quickly remedies can have an impact.

Cheese

Domestic use of cheese showed continued growth in 2021. Domestic use of all cheese was 13.0 billion pounds, up 2.7 percent over 2020. Imports of cheese increased each month (except for February and December) from the same month in 2020 and were up 13.2 percent to 0.3 billion pounds in 2021. Production of cheese also increased 2.8 percent to 13.6 billion pounds in 2021. Ending stocks of cheese on an annual basis continued their upward climb to end 2021 at 1.4 billion pounds, the highest on record.

Exports of cheese grew in the second half of 2021 as international prices strengthened ahead of U.S. prices, increasing U.S. competitiveness. Oceania cheese prices averaged 34 cents per pound higher than U.S. prices in 2021. The January 2022 export price for cheese in Oceania was 63 cents per pound above the U.S. price.

Cheddar cheese prices in 2022 are expected to average 22 cents above 2021 prices at $1.90 per pound. While slow milk production growth is expected to strengthen cheese prices, continued growth in cheese production capacity, inflation pressure on consumer income and trend improvements in milk components are expected to limit cheese price increases. This price represents a weighted average price for cheddar cheese in both 40-pound blocks and 500-pound barrels.

Whey Products

Similar to the dry skim milk markets, dry whey supplies tightened around the world. U.S. dry whey exports of 496.7 million pounds in 2021 were up 5.2 percent over 2020, but the increase all came in the first five months and then slipped below year-earlier levels. In the second half of 2021, year-over-year domestic production declined, domestic use increased, and stocks tightened, perhaps dampening the volume of dry whey available, which could strengthen domestic prices and reduce export competitiveness. Dry whey production in 2021 of 924.4 million pounds was 2.8 percent below 2020, squeezing U.S. year-end stocks to 58.3 million pounds, the lowest level since 2011.

The relatively high dry whey prices at the end of 2021 are expected to carry into 2022 because the supply and demand conditions are not expected to ease until possibly later in 2022 with increased US cheese production during the spring flush. In addition, high protein demand was reflected in

high prices for soybean meal and whey protein products in 2021 which partially influenced higher dry whey prices.

The whey complex coming off of cheese vats includes whey protein products, permeate, and lactose. Lactose prices increased in 2021 over 2020 with good export demand, but stocks are building and may indicate softening in pricing of whey products in 2022. U.S. dry whey prices are expected to converge with Western European dry whey prices in 2022. Thus, 2022 dry whey prices are expected to average 70.5 cents per pound, 13 cents more than 2021.

Milk Prices

The boost in dairy product wholesale prices in 2022 is expected to lift the all-milk price[4] to $23.55 per cwt, $4.86 above 2021. The all-milk price reflects the prices paid to producers for milk with the level of fat and other milk components in it as it comes off the farm. The Class III and IV prices are reported for milk at standardized component levels. Since average components are well-above the standard tests and are increasing over time, caution should be used when comparing the all-milk price with the Class prices. The forecast price for milk used to make cheese and whey is expected to average $3.22 per cwt higher in 2022, $20.30 per cwt of Class III with 3.5 percent butterfat. The relatively high butter and nonfat dry milk prices result in a $6.21 per cwt increase in the average price for milk used to make these products. The forecast Class IV price for milk with 3.5 percent butterfat, $22.30 per cwt, is higher than the Class III price for 2022, though the Class IV price is expected to move down, closer to the Class III price, as the year progresses.

Additional information about the 2022 dairy forecast is available at:

World Agricultural Outlook Board (WAOB)
World Agricultural Supply and Demand Estimates
www.usda.gov/oce/commodity/wasde/index.htm

Economic Research Service (ERS)
Livestock, Dairy, and Poultry Situation and Outlook
https://usda.library.cornell.edu/concern/publications/g445cd121?locale=en

Foreign Agricultural Service (FAS)
Dairy: World Markets and Trade
https://www.fas.usda.gov/data/dairy-world-markets-and-trade

Dairy Program/Agricultural Marketing Service
https://www.ams.usda.gov/about-ams/programs-offices/dairy-program

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Information on Federal Milk Marketing Orders
https://www.ams.usda.gov/rules-regulations/moa/dairy

Dairy Market News
https://www.ams.usda.gov/market-news/dairy

USDA Commodity Procurement
https://www.ams.usda.gov/commodity-procurement

U.S. Milk Supply and Use

	2019	2020	2021 Est. Jan	2021 Est. Feb	2022 Proj. Jan	2022 Proj. Feb
Milk			*Billion Pounds*			
Production	218.4	223.2	226.2	226.3	227.7	227.2
Farm Use	1.0	1.1	1.1	1.1	1.1	1.1
Fat Basis Supply						
Beg. Commercial Stocks	13.8	13.6	15.6	15.6	14.7	14.4
Marketings	217.4	222.1	225.2	225.2	226.6	226.1
Imports	6.9	6.8	6.7	6.5	6.8	6.9
Total Cml. Supply	238.1	242.5	247.4	247.4	248.1	247.3
Fat Basis Use						
Commercial Exports	9.1	9.3	11.7	11.6	11.2	11.0
Ending Commercial Stocks	13.6	15.6	14.7	14.4	14.5	14.1
CCC Donations	0.2	0.3	0.0	0.0	0.0	0.0
Domestic Commercial Use	215.2	217.4	221.0	221.4	222.4	222.2
Skim-solid Basis Supply						
Beg. Commercial Stocks	10.7	10.2	10.9	10.9	10.5	10.8
Marketings	217.4	222.1	225.2	225.2	226.6	226.1
Imports	5.8	5.6	5.8	5.8	5.6	5.7
Total Cml. Supply	233.9	237.9	241.9	241.9	242.7	242.6
Skim-solid Basis Use						
Commercial Exports	41.5	47.2	51.6	51.1	51.8	51.2
Ending Commercial Stocks	10.2	10.9	10.5	10.8	10.6	10.6
CCC Donations	0.2	0.1	0.0	0.0	0.0	0.0
Domestic Commercial Use	182.0	179.7	179.8	179.9	180.3	180.8

CCC Donations include purchases made through the USDA Trade Mitigation program. They do not include products purchased under other programs. Dairy domestic commercial use for 2020 includes additional milk marketed but not processed. Note: Totals may not add due to rounding.

U.S. Dairy Prices

	2019	2020	2021 Est. Jan	2021 Est. Feb	2022 Proj. Jan	2022 Proj. Feb
Product Prices 1/			*Dollars Per Pound*			
Cheese	1.7586	1.9236	1.6755	1.6755	1.875	1.900
Butter	2.2431	1.5808	1.7325	1.7325	2.300	2.390
Nonfat Dry Milk	1.0419	1.0417	1.2693	1.2693	1.550	1.665
Dry Whey	0.3799	0.3621	0.5744	0.5744	0.645	0.705
			Dollars Per Cwt			
Milk Prices 2/						
Class III	16.96	18.16	17.08	17.08	19.65	20.30
Class IV	16.30	13.49	16.09	16.09	20.90	22.30
All Milk 3/	18.65	18.24	18.65	18.69	22.60	23.55

1/ Simple average of monthly prices calculated by AMS from weekly average dairy product prices for class price computations. 2/ Annual Class III and Class IV prices are the simple averages of monthly minimum Federal order milk prices paid by regulated plants for milk used in the respective classes. All milk price is the simple average of monthly prices received by farmers for milk at average test. 3/ Does not reflect any deductions from producers as authorized by legislation.

Source: USDA/WASDE, 621, February 2022

Supply and use of dairy products, 2020 and 2021

Year	Supply: Beginning commercial stocks	Supply: Production	Supply: Imports	Supply: Total supply	USDA net removals, etc.	Commercial use: Domestic	Commercial use: Exports	Commercial use: Total	Ending commercial stocks
				Million pounds					
Butter									
2020	189.7	2,145.4	83.4	2,418.5	7.2	2,090.6	46.9	2,137.4	273.8
2021	273.8	2,063.2	100.6	2,437.6	-	2,140.3	98.3	2,238.6	199.1
Dry skim milk products									
2020	260.0	2,704.5	1.6	2,966.1	7.3	876.1	1,786.1	2,662.3	296.5
2021	296.5	2,585.8	0.8	2,883.1	-	665.5	1,967.7	2,633.1	250.0
American cheese									
2020	749.9	5,337.5	24.8	6,112.2	11.9	5,146.5	152.1	5,298.6	801.7
2021	801.7	5,532.1	28.3	6,362.0	-	5,323.7	192.1	5,515.7	846.3
Other-than-American cheese									
2020	572.1	7,915.9	257.2	8,745.2	1.2	7,517.9	631.5	8,149.4	594.6
2021	594.6	8,092.5	291.0	8,978.1	-	7,679.3	700.1	8,379.3	598.8
Dry whey									
2020	71.4	951.0	0.5	1,022.8		485.1	472.2	957.2	65.6
2021	65.6	924.4	1.6	991.7		436.7	496.7	933.4	58.3
Whey protein concentrate									
2020	66.5	477.7	46.1	590.3		203.4	324.0	527.4	62.9
2021	62.9	496.3	46.3	605.4		236.1	299.2	535.4	70.0
Lactose									
2020	110.7	1,102.8	7.1	1,220.5		266.2	831.2	1,097.5	123.0
2021	123.0	1,121.7	7.4	1,252.1		237.9	866.5	1,104.4	147.8

Sources: USDA, National Agricultural Statistics Service; USDA, Farm Service Agency; USDA, Foreign Agricultural Service; U.S. Department of Commerce, Bureau of the Census; and USDA, Economic Research Service calculations.