FARM CREDIT EAST

2022 NORTHEAST DAIRY FARM SUMMARY & 2023 MID-YEAR OUTLOOK


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ACKNOWLEDGMENTS

The *Northeast Dairy Farm Summary (DFS)* was first published in 1980 with data from 1979. No research project of this scope would be possible without the collaboration and hard work of many individuals. The current author would like to thank the authors who preceded him in writing the *DFS* over the past 43 years.

In addition, thanks are due to all Farm Credit East lending and financial services staff, who reconciled reams of financial data from a large number of farms and entered the information into our system. Every year, their hard work provides the raw material for creating the *DFS*. This report is truly a "team effort."

Most importantly, the entire Farm Credit East team extends our sincere thanks to the hardworking Northeast dairy producers who entrusted their farm data to this project. We hope the end product is helpful in your continual pursuit of improved farm management. You inspire us all with the valuable work that you do.

2022 NORTHEAST DAIRY FARM SUMMARY

Highlights

- Net earnings for our sample of 139 Northeast farms increased to an average of $945 per cow in 2022,[1] from $374 per cow in 2021.
- Total costs increased significantly, rising by 25% from 2021 to 2022. Total expenses per cwt. increased by $5.31 per cwt. to $26.81 in 2022.[2]
- Net cost of production[3] (NCOP) increased to $22.87 per cwt., $4.27 greater than 2021.
- Some specific cost categories which changed in 2022 are:
  - Feed expense, a farm's largest cost, increased from $1,782 per cow in 2021 to $1,992 per cow in 2022.
  - Fuel expenses increased by 78% per cow as fuel and oil prices rose substantially from the prior year. The milk hauling assessment subsequently increased as well.
- Productivity decreased slightly. Per cow production in our sample herds was 4.1% below the prior year. Milk sold per worker decreased 6.6% due to fewer cows per worker, as well as lower per-cow production. These changes appear largely due to shifts in the makeup of our sample rather than decreases among individual farms.
- Cash flow was sufficient, on average, to meet financial commitments (e.g., operating expenses, debt repayment, family living and income taxes), resulting in an average cash margin (excluding government payments) per cwt. of $6.43.[4] This is the largest cash margin, in nominal terms, in the history of the *DFS*. Many farms used these funds to reinvest in their businesses.
- Percent net worth in our sample increased to 69%. Both average assets and liabilities increased. Total debt-per-cow increased from $4,672 to $5,200.

PROFILE OF THE AVERAGE FARM IN THE *DFS*

	2021	2022
Number of Cows	568	821
Milk Sold per Cow	25,823 lbs.	24,775 lbs.
Milk Sold per Worker	1,343,002 lbs.	1,254,778 lbs.
Milk Price per Cwt.	$19.21	$26.66
NCOP per Cwt.	$18.60	$22.87
Net Worth	67%	69%
Net Earnings per Cow	$374	$945
Net Household Income per Cow	$414	$1,004
Return on Assets	3.8%	6.9%

[1]On an accrual basis, after family living, not including nonfarm income.
[2]Including family living.
[3]Total farm expense, plus family living, less non-milk income. For more information, see page 8.
[4]See figure 7.

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INTRODUCTION

This year marks significant changes to Farm Credit East's *Dairy Farm Summary (DFS).* After a number of years, we have decided to shift the focus of the report from a retrospective analysis of the prior year, to a more forward-looking document. However, the overall purpose of this report remains the same: To assess the financial health and progress of dairy farm businesses within the Northeast. It is intended to provide dairy producers, Farm Credit staff, Northeast public policymakers and dairy industry leaders with a better understanding of the current status of the Northeast's largest farm sector.

While the report still contains data and analysis from the prior year (2022), it also contains forward-looking discussion and analysis from leading dairy economists, including Dr. Christopher Wolf of Cornell University, Rob Fox of CoBank, and Dr. Marin Bozic and Brian Walton of Bozic LLC.

As a major regional summary of actual dairy farm business results, the *DFS* is a unique project within the U.S. dairy industry. The *DFS* has been published for 43 consecutive years, beginning in 1980 with 1979 financial data. Past editions are available upon request.

We believe this sample of 139 farm operations represents a cross section of better-than-average Northeast dairy farm businesses, most of which maintain loan relationships with Farm Credit. The farms analyzed range from 32 milking cows to more than 6,000. While our sample is skewed towards larger farms than the actual distribution of farm sizes in the region, we have weighted each of the three size categories (1-299 cows; 300-699 cows; and 700 or more) equally in coming up with all-farm averages, to provide a more balanced look at results across a range of farm sizes. We should also note that by only including farms able to supply complete and accurate financial statements by May 1st of this year, we are likely to skew the sample towards farms that may be more profitable than the true average of all dairy producers in the region.

All farms included in the study received the majority of their income from milk sales, but many farms have additional business income, such as custom work, maple sugaring or crop sales. We have purposely not excluded these farms from the sample (unless such income exceeds 50% of total farm income) as we believe it reflects the diverse face of Northeast dairying, where many producers have supplementary income streams.

If such ancillary business activity constitutes a separate enterprise from the main dairy farming activity, and both revenue and expenses can be broken out, the net return is included in *nonfarm income*, along with income from off-farm employment. If the expenses of this ancillary activity cannot be separated from the dairy farming expenses (labor costs are often co-mingled), such revenue is included in *other farm income*. Thus, the total farm income represented in this report often includes some return from these affiliated business ventures, increasing the income that would have been generated from the dairy enterprise alone. This is typically more significant for the farms with smaller herd sizes.

Partnerships and corporations have been adjusted to a sole proprietor basis for consistency. Farms with unusual events, such as a natural disaster, a major herd-health problem, a significant inheritance, large unexplained gains or losses (>10% of total assets), or other types of business anomalies were excluded from the sample. Each farm's data was carefully reviewed to ensure both cash flow and net worth reconciled within a limited margin of error. This approach ensures a high level of integrity for the financial results presented in the *2022 Northeast Dairy Farm Summary*.

The *DFS* tends to focus discussion on the "average farm." While there is no single farm which is exactly "average," focusing on the average farm within our sample allows us to highlight changes of Northeast dairy farms over time. While the use of averages may lead to an effective discussion with respect to change and overall industry trends, it tends to minimize the best and worst conditions experienced by farms within the sample.

This continues to be true in a year such as 2022. While the "average farm" within our group of 139 had $945 per cow in net earnings, eight of the farms in our sample had net losses, even in a high milk-price year. Results ranged from just over $3,000 in net earnings per cow, to a loss of more than $1,000 per cow. The standard deviation of net earnings was $784, indicating a great deal of variability within the sample.

Focusing on average results discounts the fact that while many producers are able to achieve positive earnings, others, of all sizes, struggle to make a profit in this challenging industry. For this reason, we also look at the data within individual herd-size groups and within the top and bottom profitability groups.

Figure 1

Dairy Farm Profitability

	Net Earnings per Cow[1]	Standard Deviation	Return on Assets[2]	Return on Equity[3]
2018	$ -40	$535	1.2%	-0.5%
2019	$ 447	$518	5.2%	5.4%
2020	$ 663	$582	6.4%	7.6%
2021	$ 374	$609	3.8%	4.0%
2022	$ 945	$784	6.9%	8.2%
3-Year Average	$ 661		5.7%	6.6%
5-Year Average	$ 478		4.7%	4.9%
10-Year Average	$ 422		4.2%	4.4%

[1]Net earnings does not include nonfarm income
[2]Return on assets = (net earnings + interest)/average total assets
[3]Return on equity = net earnings / average net worth

Figure 2A

Net Earnings Per Cow 1979-2022

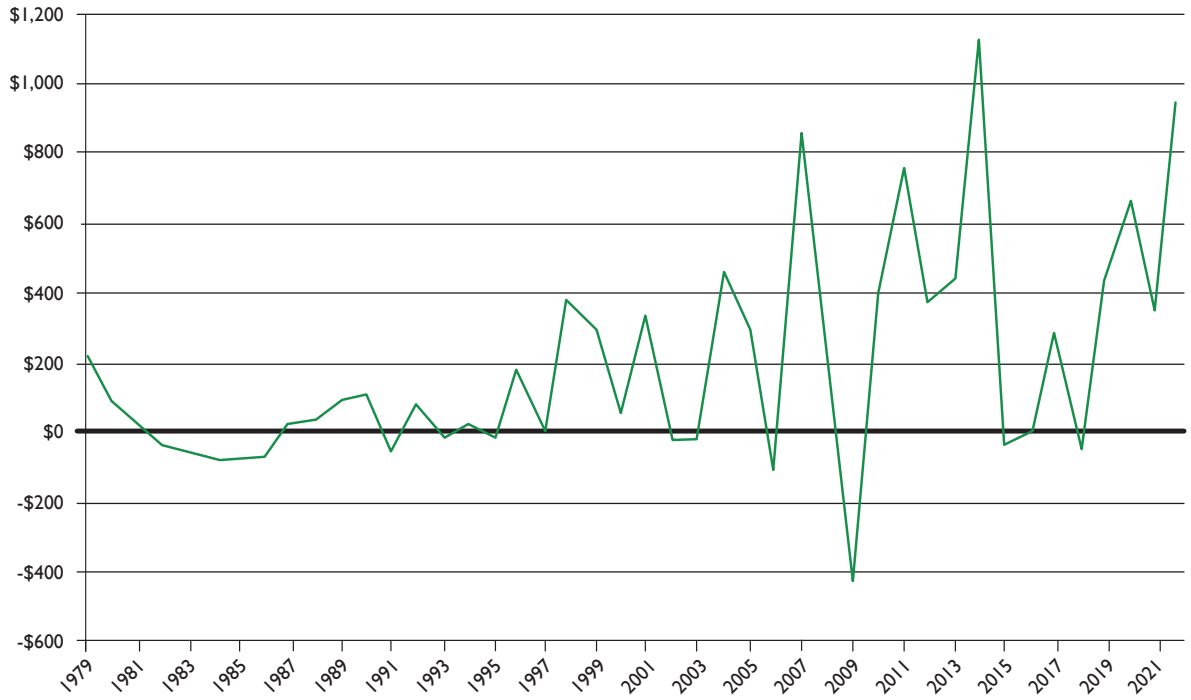
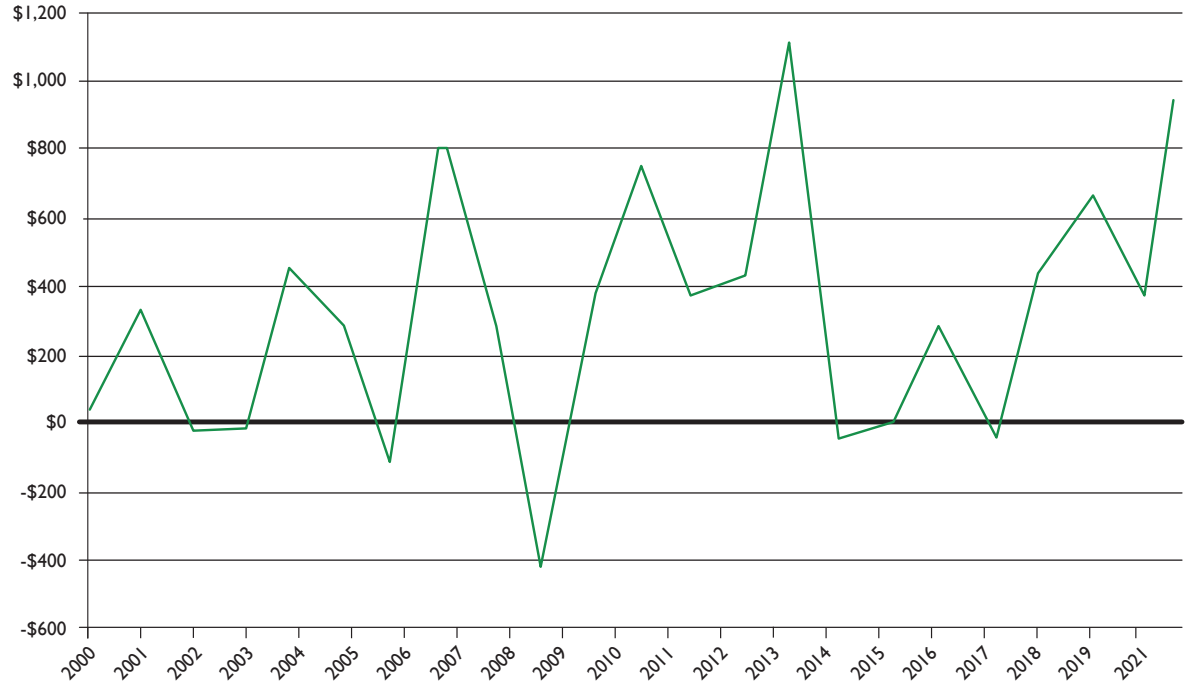


Figure 2B

Net Earnings Per Cow 2000-2022



ANALYSIS OF 2022

A Year Marked by Inflation: Milk Prices and Input Costs

If there was one overarching theme for 2022, it would be "inflation" – on both the input and the output sides. Prices increased from the prior year in amounts that have not been seen in a generation. Thankfully, milk prices increased more than input costs for most producers, making it a highly profitable year for many Northeast dairy farmers.

Already, as we sit at the midpoint of 2023, the tide has turned, and margins have become significantly tighter, but as we recap 2022, it was a remarkable year.

The milk price farmers received in 2022 increased by $7.45 per cwt. compared to the prior year, rising from $19.21 to $26.66 on average, and the average net cost of production increased by $4.27 per cwt., from $18.60 to $22.87 per cwt. This increased the profit margin on milk production over 2021.

Looking back over a five-year period, average net farm earnings ranged from -$40 per cow in 2018, $447 in 2019, $663 in 2020, $374 in 2021, and $945 in 2022 (not counting nonfarm income, such as a spouse's off-farm job). This brings the five-year average earnings to $661 per cow.

In the 43-year history of the *DFS*, 2022 ranks 2nd in terms of profitability in nominal terms, but 4th when adjusted for inflation. While the cumulative return for *DFS* farms over the life of the study remains positive, the average farm has lost money in 15 of the 43 years of the *DFS*. Farms that experience multiple years of net losses have tended to drop out of the study, often exiting the industry, leaving more profitable farms remaining.

This summary uses three primary measures of profitability, each of which provides a useful perspective on dairy farm financial performance:

- **Net earnings per cow** measures sheer dollars of profit earned and includes all farm business sources of income.
- **Return on assets (ROA)** measures profit earned relative to the present market value of total farm assets. This indicates the earning power of each dollar invested in the farming operation, regardless of whether it comes from the farm operator or was borrowed from a lender.
- **Return on equity (ROE)** measures profit earned relative to the farmer's equity investment in the operation. This measure is the best indicator of how the dairy producer's investment is paying off compared to the potential return if the funds were invested another way.

A single year does not provide an accurate picture of the dairy industry's long-term operating performance, especially given the volatility in recent years. To further illustrate, in the last 15 years we have seen three of the top four years for profitability in *DFS* history (2014, 2022 and 2011) as well as the greatest loss in *DFS* history (2009). Given these extremes, multi-year averages yield a more accurate picture of the industry. If we look at both shorter- and longer-term averages, we see similar results (Figure 2A). Continued year-to-year volatility confirms the challenges and opportunities that Northeast dairy producers face.

Figure 2C

Comparison of Multiyear Averages

	Three-Year Average	Five-Year Average	Ten-Year Average
Net Earnings per Cow	$661	$478	$422
Return on Assets	5.7%	4.7%	4.2%
Return on Equity	6.6%	4.9%	4.4%

It is important to differentiate net earnings (profit) from cash flow. Farm businesses rely on cash flow to pay ongoing bills, but cash flow is not an accurate measure of profitability. Net earnings are an accrual measure of profit, which represents a farm business's ability to provide an economic return for the operator's investment and management. It offers the best measure of a farm's profitability by adjusting cash farm income and expenses to reflect changes in inventories, accounts receivable, accounts payable and prepaid expenses. Conversely, some farms may show positive net income on an accrual basis, yet struggle with cash flow.

It is important to note that principal payments on debt, while a significant cash obligation, are not a deductible expense and must be paid out of earnings. Thus, both accrual net earnings and positive cash flow are essential for a dairy farm to survive and grow.

The average farm milk price at $26.66 per cwt. was $7.45, or 38.8% greater than 2021's $19.21. It was $6.52 greater than the previous five-year average of $20.14 per cwt. (Figure 3A). In terms of actual (nominal dollars, not adjusted for inflation) milk prices, 2022 ranked 1st in the 43 years of the *DFS*. However, to better understand the true story of how milk prices have changed over time, we must account for the impact of inflation (Figure 3B). In terms of "real," inflation-adjusted rankings, 2022 drops to 17th. The first year of the *DFS*, 1979, ranks first, with an inflation-adjusted milk price of $40.80/cwt. in 2022 dollars.

Figure 3A

Farm Milk Prices Per Cwt.

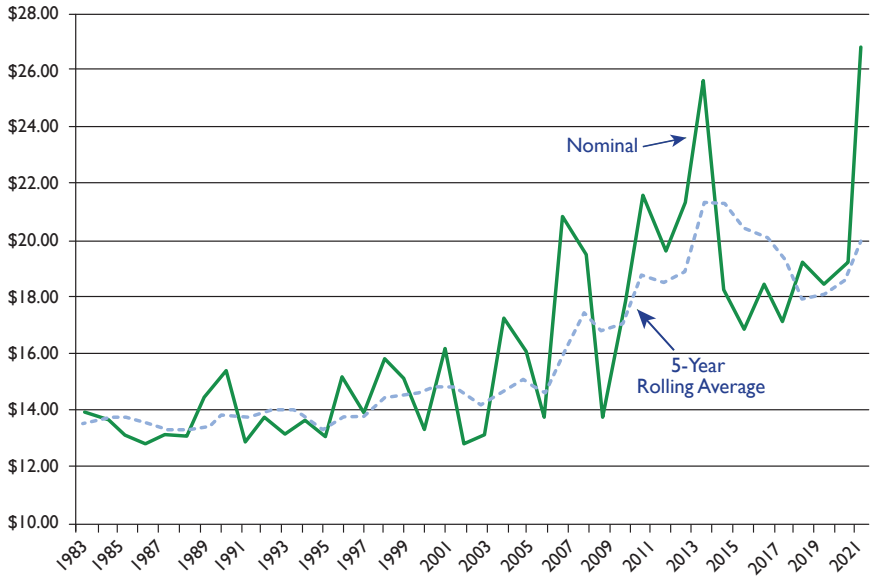
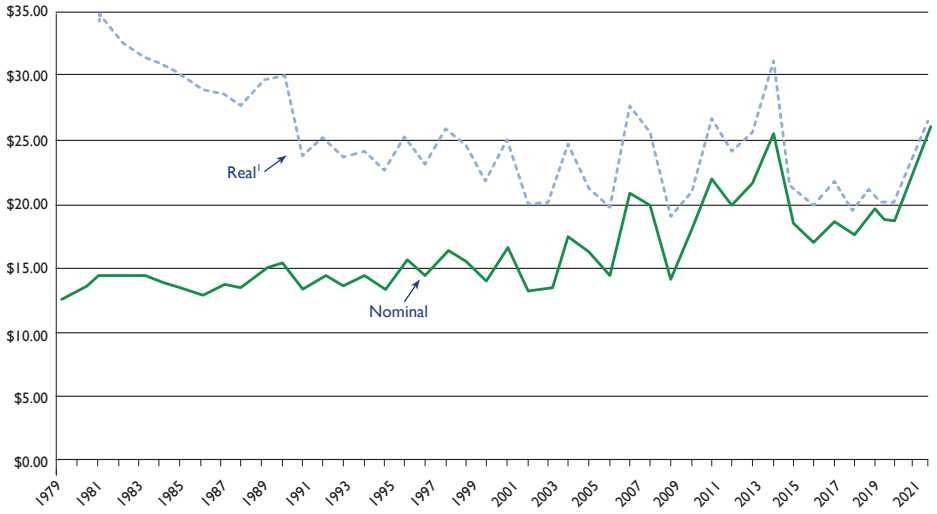


Figure 3B

Farm Milk Prices Per Cwt.



[1]Nominal price adjusted for inflation

COST OF PRODUCTION INCREASES

The net cost of producing milk in the Northeast has generally increased over the past five years.

Three key figures to review for 2022's cost of production analysis of the average dairy farm in the *DFS* include:

- Cash operating expenses were $24.29 per cwt., $4.50 greater than 2021.[5]
- Total costs, including depreciation and family living, were $26.81 per cwt., $5.31 per cwt. greater than 2021.
- Non-milk farm income for 2022 was greater than in 2021. After subtracting non-milk farm income, NCOP was $22.87 per cwt., $4.27 above the previous year.[6]

Figure 4A

Cost of Producing Milk – Accrual Basis

	2018	2019	2020	2021	2022
			Dollars per Cwt.		
Feed	$ 6.45	$ 6.30	$ 6.64	$ 6.90	$ 8.04
Labor	3.19	3.26	3.35	3.42	3.10
Interest	0.76	0.80	0.57	0.60	0.84
Freight & Trucking	1.14	1.14	1.22	1.29	1.42
Crop Inputs	1.14	1.06	1.22	1.33	1.92
Other Expenses	5.92	6.03	6.29	6.25	8.97
Adjusted Cash Operating Expenses	$18.60	$18.59	$19.29	$19.79	$24.29
+ Depreciation	1.28	1.20	1.16	1.31	1.82
+ Family Living	0.48	0.41	0.34	0.40	0.70
Total Costs	$20.36	$20.20	$20.79	$21.50	$26.81
- Non-Milk Income[1]	2.64	2.39	2.68	2.90	3.94
Net Cost of Production[2]	$17.72	$17.81	$18.11	$18.60	$22.87

[1]Non-milk income includes cattle, crop and other income adjusted for inventory changes.
[2]Before any return on equity. If we assume a return on equity to be an imputed cost, each 1% return on equity would be equivalent to another $0.47 added to the NCOP for 2022. For a 6% ROE, NCOP would be $25.69.

Despite increases in many expenses in recent years, Northeast dairy producers managed to limit cost-of-production increases. Categories where costs increased included feed, fuel, and crop inputs. Labor showed a 13% decrease on a per cow basis, which was likely due to a shift in the *DFS* sample to weight small farms with fewer hired workers more heavily rather than a significant decrease in average wages paid per hour or per worker. On the contrary, all indications are that hired workers have become more expensive in recent years.

[5]Does not include family living or depreciation.
[6]Nonfarm income and government payments are not factored into NCOP.

Minimum wage increases in many Northeast states and an overall tightening of the labor market continue to put upward pressure on labor costs per hour, leading to a push for efficiency and lower staffing levels on many farms.

In New York State, 2020 saw the implementation of mandatory overtime pay for agricultural workers, with a 60-hour threshold for time-and-one-half pay. The Farm Laborers Wage Board, a three-person panel tasked with making recommendations regarding the overtime threshold, has recommended a gradual phase-down of that threshold to 40 hours over a 10-year period. Although the state has approved tax credits to cover the overtime between 40 and 60 hours, the industry will need to make significant adjustments to maintain profitability with a 40-hour overtime threshold. Given that hired labor is typically the second greatest expense on most dairy farms, managing labor efficiently is a significant contributor to the profit (or loss) of a farm.

Farms responded to increased wage expenses in different ways. Some smaller farms reduced either the hours worked by hired labor or the number of hired workers, and increased their usage of family labor. Some larger farms tried to become more efficient in their use of hired workers by increasing the number of cows per worker and by reducing hours to the 60-hour threshold or close to it. Some attempted to hire additional workers to manage the amount of overtime per worker, with varying degrees of success. The scarcity of both local resident and migrant workers, as well as housing limitations, made this tactic a challenge, and indeed many farms had to operate in 2022 with fewer workers than they might have liked.

The significant usage of family labor on Northeast farms somewhat masks the impact of increasing hired labor costs, most notably on smaller farms. Many farms using mostly family labor show zero, or a very small amount, for hired labor expense, relying on the family living draw for compensation. We make no adjustment for un- or under-paid family labor in the *DFS*, reporting only the actual funds spent without any imputed cost for this work, despite the fact that it has significant value.

Fuel was the category with the most notable increase, as energy prices rose sharply. Fuel expense went from $174 per cow in 2021 to $310 per cow in 2022.

Repair expense, typically one of the top four expenses on a dairy farm, increased by 20.7% per cow, to $443 per cow. This could indicate that dairy producers used their 2022 earnings to catch up on deferred maintenance that had been put off in prior years.

Interest expenses increased due to rising interest rates on farm debt. This category increased by 35.7% from the prior year.

Crop inputs also increased, rising 38.5% per cow to $475, with increases across the board in agricultural chemicals, fertilizer, and seed costs.

Figure 4B

Specific Cost Categories

	2021		2022		Percent Change	
	per Cow	per Cwt.	per Cow	per Cwt.	per Cow	per Cwt.
Feed	$1,782	$6.90	$1,992	$8.04	11.8%	16.5%
Labor	$ 884	$3.42	$ 767	$3.10	-13.2%	-9.6%
Fuel	$ 174	$0.67	$ 310	$1.25	78.2%	85.7%
Supplies	$ 240	$0.94	$ 317	$1.28	30.5%	36.0%
Rent	$ 139	$0.39	$ 116	$0.47	13.7%	18.5%
Repairs	$ 389	$1.42	$ 443	$1.79	20.7%	25.8%
Interest	$ 154	$0.60	$ 209	$0.84	35.7%	40.0%
Crop Inputs	$ 313	$1.33	$ 475	$1.92	38.5%	44.3%
All Other Expenses	$1,398	$5.41	$1,836	$7.41	31.3%	37.0%

The formula used in the *DFS* for calculating NCOP is as follows:
[Cash Operating Expenses (with accrual adjustments made for pre-pays, accounts payable, etc.) + Calculated Depreciation[7] + Family Living Expense] - Non-Milk Farm Income[8] = Net Cost of Production.

It is important to note that the $22.87/cwt. average NCOP includes no return on the producer's equity investment. While it may be debatable what an appropriate return on equity (ROE) might be, earning some level of return should be a business objective, and is indeed necessary for the repayment of debt and for reinvestment in the business. For the average *DFS* producer in 2021, each 1% return on equity would be equivalent to an additional $0.47 per cwt. If we were to include a 6% ROE goal as part of NCOP, for example, this would be equivalent to a $25.69 NCOP, much closer to the actual milk price in 2022.

[7] For the *DFS*, all farms have their submitted depreciation restated by applying a standard percentage of straight-line depreciation to various asset classes in order to compare consistent numbers from farm to farm and avoid variations driven by accounting and changes in tax laws.
[8] Non-milk income includes cattle, crop and other income adjusted for inventory changes, but does not include nonfarm income or government payments.

Figure 4C shows NCOP by herd size. Generally, larger herds have an advantage in spreading fixed costs over more units, driving per-unit cost down through higher production per cow and greater capital efficiency. Smaller herds typically have lower labor costs and higher non-milk income per unit; however, family living and other costs are usually higher, on a per-unit basis.

Figure 4C

NCOP By Herd Size

Cost per Cwt.	< 299 Cows	300-699 Cows	700+ Cows
Feed	$ 6.99	$ 8.49	$ 8.47
Labor	2.33	3.18	3.63
Interest	1.05	0.79	0.73
Freight & Trucking	1.30	1.47	1.48
Crop Inputs	2.21	2.11	1.50
Other Expenses	11.86	8.09	7.42
Adjusted Cash Operating Expenses	$25.74	$24.13	$23.23
+ Depreciation	2.82	1.68	1.13
+ Family Living	1.55	0.52	0.19
Total Costs	$30.11	$26.32	$24.56
- Non-Milk Income*	5.44	3.74	2.94
Net Cost of Production	$24.67	$22.59	$21.62

*Non-milk income includes cattle, crop and other income adjusted for inventory changes. It does not include government payments.

CASH FLOW FROM MILK INCOME INCREASES

Cash flow is another measure of financial health for a dairy operation or any business. Each business has a minimum cash requirement to meet its ongoing commitments, such as operating costs, overhead, debt service payments and family living. The remainder can be used for capital investment, such as to replace older equipment, build liquidity, or invest in a retirement fund. Cash margin from milk income increased significantly from 2021, averaging $6.43/cwt. compared to $0.66 in 2021, $0.35 in 2020, $1.43 in 2019, and -$0.49 in 2018 (Figure 5).[9] Prior to 2019, the average *DFS* farm had four straight years of negative cash flows. This means that although the average farm in our sample has had positive cash flow for the last four years, they may still carry increased debt loads from prior years of negative cash flows.

Figure 5

Cash Flow Analysis Per Cwt.

	2018	2019	2020	2021	2022
Actual Milk Price	$17.19	$19.18	$18.48	$19.21	$26.66
Cash Required	$20.66	$20.62	$21.18	$21.80	$23.79
- Other Income	2.98	2.87	3.05	3.25	3.56
Breakeven Milk Price	$17.68	$17.75	$18.13	$18.55	$20.23
Cash Margin	$-0.49	$ 1.43	$ 0.35	$ 0.66	$ 6.43

Cash Margin Definitions

Total cash operating expenses
+ Family living expense and income tax
+ Scheduled principal payments
= Cash required

Cattle sales
+ Capital sales
+ Crop sales
+ Other farm income
= Other income

Figure 5 shows the range of cash margins from milk income for the average Northeast dairy farm since 2018. Due to cost inflation and increasing debt levels, the breakeven milk price has increased significantly from approximately $14 per cwt., which was common prior to 2007, to a peak of over $20 in 2014, and again in 2022. Milk prices have fluctuated in recent years, setting new records in 2011, 2014 and 2022, but declining between 2014 and 2022. Note that this calculation looks at milk income only and does not account for government payments, which were more significant in 2020 than before or after that year.

Given the variation in average cash margins, making a financial decision based on a single year's performance would be difficult. Figure 5 further illustrates this point: While the cash margin was positive for the last four years, it was negative for the four years prior to 2019.

This level of variability makes financial management more challenging, underscoring the importance of a long-range view of cash flow. Timing of major capital expenditures, managing debt load, building liquidity for the tight years, and adjusting family withdrawals are all means of managing volatility. Some producers have adopted risk management strategies involving both input costs and milk prices using a combination of crop insurance programs, such as Livestock Gross Margin (LGM-Dairy) and the Dairy Revenue Protection (DRP) coverage, other government programs such as the Dairy Margin Coverage (DMC), as well as hedging strategies.

[9]The cash flow analysis shown in Figure 5 does not include government payments.

NET WORTH INCREASES

Net worth, or owner's equity, measures how the farm business is capitalized. It is measured at the end of each year in the *DFS* in order to consider changes from year to year. Net worth is an indicator of the ability of the business to absorb financial losses and to collateralize additional borrowing. It is also a theoretical measure of the amount of money that could be redeployed toward other endeavors if the business was liquidated.

The average *DFS* farmer's net worth increased by 2% in 2022 (Figure 6). Assets per cow increased to a greater extent than did liabilities per cow, resulting in an increase in net worth. Solvency remains solid for the average *DFS* farm, meaning that the average participant has more than enough farm assets to satisfy all farm debts, selling costs and the resulting income tax liability if they were to liquidate their operation.

Figure 6

Change In Financial Position

	Percent Net Worth[1]	Current Ratio[2]	Quick Ratio[3]	Asset Turnover[4]
2018	66%	2.5	0.9	0.41
2019	67%	2.8	1.1	0.47
2020	69%	3.4	1.5	0.48
2021	67%	2.5	1.1	0.42
2022	69%	3.3	1.6	0.45

[1]Percent net worth = Owner's net worth / total assets
[2]Current ratio = Current assets / current liabilities
[3]Quick ratio = Current assets - inventory / current liabilities
[4]Asset turnover = Value of farm production / average total assets

There is an important distinction between growth in net worth resulting from earnings versus market revaluation. Net earnings are the result of profits from dairy farming. Market revaluation generally occurs in farm real estate and, sometimes, cattle, while machinery and equipment ordinarily depreciate.

Liquidity is the ability of the farm operator to convert short-term assets (current assets) to cash to meet short-term obligations (current liabilities) as they become due. Current and quick ratios are two important measures of liquidity. In 2022, the average dairy farm had a current ratio of 3.3, an increase from the prior year (Figure 6). This means that the average farm had 3.3 times the value of current assets compared to its current liabilities.

However, since inventory on a dairy farm is primarily feed for on-farm use and not intended to be directly converted into cash to pay bills, subtracting inventory from current assets provides a closer look at a dairy farm's true short-term liquidity situation. The quick ratio takes the result (current assets minus inventory) and divides by current liabilities. The quick ratio of 1.6 at the end of the year demonstrates that the average farm had sufficient near-cash assets (such as cash and accounts receivable), excluding inventory, to meet the current year's financial obligations. This indicates that producers had, on average, 160% of the value of short-term liabilities available in cash or assets that could be quickly converted to cash.

Finally, asset turnover is commonly used to measure the efficiency of total capital invested in the business by determining gross revenue dollars generated for every dollar invested. The higher the asset turnover ratio, the more efficiently the investment is working for the business. Thus, greater asset turnover should translate into a higher return on assets (ROA). In 2021, the asset turnover ratio for the average Northeast dairy business was 0.45, slightly higher than 2021. This was a result of an increase in cash receipts relative to the assets of the farms in the sample with $0.45 of gross revenue generated for every $1 invested in assets.

CONCLUSION

2022 was truly a remarkable year for dairy producers. Milk prices hit a record high, in nominal terms (notably, when adjusted for inflation, we have seen higher prices in the past).

The average dairy producer, of all sizes, was able to realize significant net earnings last year, although we continued to see a range of financial results with some farms doing exceptionally well, while others struggled, even in a high milk price year such as 2022.

2023 is already turning out to be a very different scenario. As the outlook articles that follow this report discuss, we have seen significant cost inflation in agriculture (and indeed across the entire economy). 2022 was a successful year for dairy producers because milk prices increased to a greater extent than costs did. In 2023, milk prices have retreated, but costs have remained high, resulting in much tighter margins. May 2023 saw a DMC income over feed cost margin of only $5.31/cwt., compared to $12.51/cwt. in May 2022. Moreover, with the increase in prices of everything from energy to supplies, the IOFC margin does not go as far towards costs as it might have in the past.

The strong earnings of 2022 will be critical for Northeast dairy producers as they navigate the tighter margins of 2023 and beyond. Many producers used their 2022 earnings to catch up on deferred maintenance and repairs to their facilities, pay off loans, upgrade and replace worn equipment, and generally shore up their cash position knowing that a decline in milk prices was around the corner. Unlike in past high-earnings years, major expansion activity was more restrained, in part due to base-excess limitations put in place by some milk buyers and cooperatives.

While the last four years were reasonably good years for many Northeast dairy producers, it was preceded by several challenging years from 2015-2018, and producers now face uncertainty in terms of milk prices, input costs, and increasing regulations. Therefore, readers should consider the results of multiple years if drawing long-term conclusions. Despite the positive cash flow from 2022, many producers had seen significant balance sheet erosion due to the negative cash flows of 2015, 2016 and 2018.

We noted in 2016 that total liabilities exceeded $4,000 per cow for the first time in *DFS* history. This was worth mentioning because while it took 29 years for average debt-per-cow to climb from $2,000 to $3,000, it took only eight years to exceed $4,000 per cow. In 2022, total liabilities now exceed $5,000 per cow, only six years since the $4,000 level was first reached. Of course, there is impact from inflation during this period, but it still raises concerns about the increasing leverage of the average farm, and their ability to maintain debt service and cash flow during periods of low margins. In 2022, we saw total debt per cow climb to $5,200, with intermediate and long-term debt totaling $4,297.

During these periods of unpredictable markets and low prices, managing risk is more important than ever, given the high levels of debt carried by many farms, and the uncertainty they face in commodity prices on both the input and output sides.

The greatest risk management tool remains smart management and cost control. By continuing to invest in property, livestock and equipment, Northeast producers are generally well-positioned to manage tighter margins as milk prices decline in 2023.

[10]Total liabilities per cow, including current liabilities.

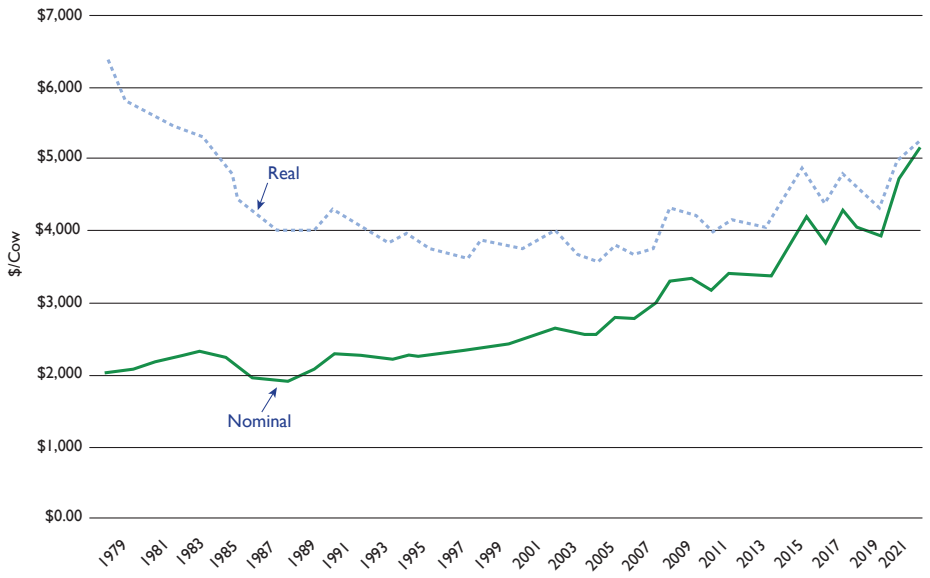
One of the key takeaways from the *Northeast Dairy Farm Summary* is that there are multiple paths to dairy farm profitability. Strategies are as different as the individual characteristics of farms within this study, and there is certainly more than one way to achieve industry-leading returns. Working closely with your Farm Credit loan officer and/or business consultant to assess your strengths and weaknesses and develop a strategy to position your farm to meet industry challenges and take advantage of business opportunities is now more critical than ever.

If you are interested in improving your profitability, the *DFS* is only the beginning. Farm Credit's *Success Strategies Dairy Benchmarks* delves much deeper into not only farm financial data, but a host of production and herd management metrics as well. Membership includes a personalized profit assessment of your farm. For more information on this program, a joint project between Farm Credit East and Horizon Farm Credit, contact a representative of one of those partner organizations.

We hope that this year's *Northeast Dairy Farm Summary* is a useful tool for managing your farm and business. It remains essential that dairy farmers and those who serve them continue to have good data upon which to make decisions in order to have a healthy, economically sustainable Northeast dairy industry. The entire Farm Credit team of loan officers, farm accounting professionals and business consultants are eager and prepared to help Northeast dairy farmers achieve financial success. On behalf of our entire team, thank you for your interest and participation.

Figure 7

Total Liabilities Per Cow



Real = adjusted for inflation

2023 DAIRY MARKET AND POLICY OUTLOOK

Dr. Christopher Wolf, Cornell University

2022 Review

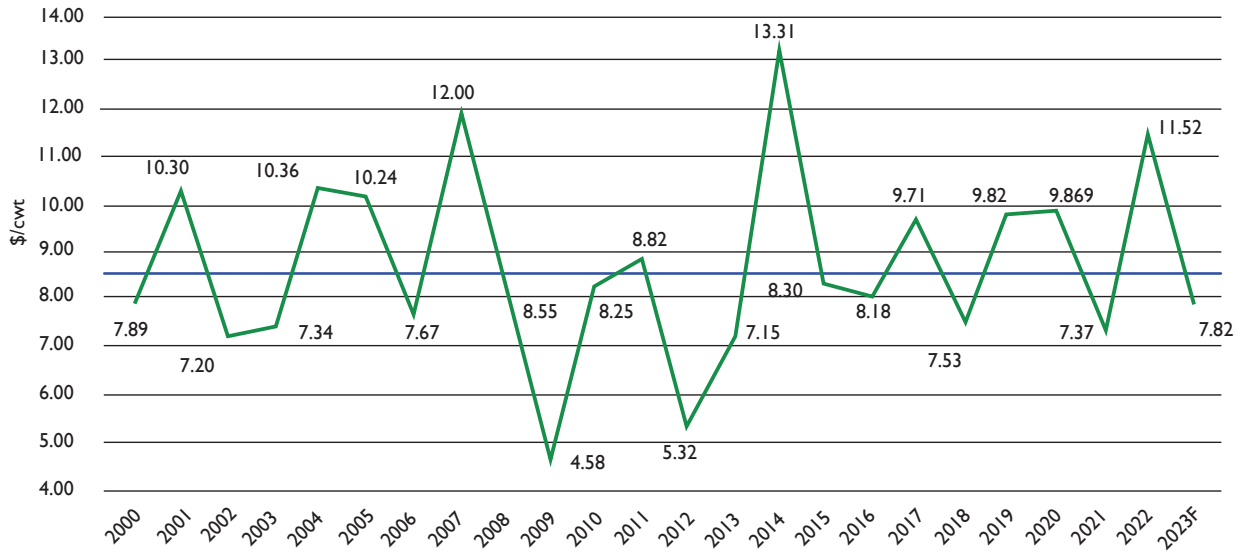
By far the biggest economic story of 2022 was inflation — particularly with respect to energy, food and housing — which averaged about 8%. In response, the Federal Reserve raised the federal funds rate seven times in 2022, and three more times so far in 2023. Some long-term farm debt may be locked in at the previous lower interest rates, but new or operating debt will be more expensive for the foreseeable future.

The U.S. all milk price hit a record (nominal) high of $27.30/cwt. in May and finished at an average of $25.55/cwt. The income over feed cost margin (IOFC) is a proxy for dairy farm profitability as well as the trigger for Dairy Margin Coverage payments. The average IOFC from 2000 through 2022 was $8.75/cwt. (see Figure 1). Historically, about three-quarters of the variation in IOFC has been driven by the milk price.

From Figure 1, it is clear that 2007, 2014 and 2022 were profitable years, while 2009 and 2012 resulted in large losses. There is a tendency for margins to move back toward the average value as milk production and consumption react to demand or supply shocks, but over-shooting high and low is the norm.

Figure 1

US Income Over Feed Cost Margins, 2000-2022



Nationally, the U.S. finished 2022 with 9.4 million milk cows, which was 67,000 more than the end of 2021. 2022 milk production trailed 2021 by 0.7% through the first six months but finished the year up +0.2% — essentially flat — based on 1.1% growth year-over-year in the second half of 2022. The growth to finish the year provides a degree of momentum entering 2023.

However, milk production growth was not uniform, with Texas and South Dakota having particularly large increases. Other parts of the country, including the Northeast and California, responded to a lesser extent to the higher margins. This reflected several factors, including that the margins themselves were less indicative of profit than in the past given increases in energy and labor costs.

Feed cost increases were not uniform with California in particular dealing with high forage costs due to drought. Another factor is the base programs established by some milk buyers and co-ops which were estimated to affect 50% of U.S. milk production in 2022.

Internationally, milk production shrank year over year in New Zealand, Australia and the European Union which presented opportunity for U.S. dairy exports to fill the gaps. Higher product prices also contributed to increased export revenue for U.S. dairy products. The result was that U.S. dairy exports increased by 25% in value over 2021 levels through November although quantity of exports increased only 5%.

2023 Outlook

Uncertainty abounds for the remainder of 2023. At the time of writing, 2023 dairy product and farm milk prices have been trending downward from their lofty 2022 levels. Milk production is forecast to increase slightly in 2023 following the generally profitable prior year. The northeast is likely to continue to lag other regions in milk production growth as base programs cap desired farm-level increases. On the demand side, the key factors for 2023 include the general economy for domestic demand. On the international side, China is key for dairy markets.

Economic pundits in the U.S. are making a full-time job out of predicting whether, and when, a recession might hit the U.S. Many leading indicators suggest a recession is pending as the Federal Reserve endeavors for a soft landing from inflation. A recession would impact demand through reduced consumer income and resulting purchasing power. The effects of any recession on farm milk price are likely to depend very much on where and for what product the milk is utilized. Past research suggests that eating away from home declined by 13% during the 2007-09 time period, but bear in mind that was a particularly deep recession. Still, the COVID experience sharpened insights into how differently U.S. consumers' dairy product eating habits are at home (more beverage milk, cream cheese, yogurt) compared to eating out (more cheese, less beverage milk).

The Chinese economy seems to be in a fragile position at the current time. One factor is the removal of the zero-COVID policy which has resulted in widespread infection and resulting difficulties. China was already dealing with economic headwinds including a large housing bubble. While Mexico and Canada are more reliable trade destinations, China is important to the U.S. dairy industry because Chinese purchases of U.S. dairy products have been correlated with high farm milk price years. In both 2014 and 2022, dairy exports to China were key to high international dairy product prices. China has increased milk production in recent years and produces almost all its fluid milk needs but is heavily reliant on imports for cheese, butter and milk powders. 2023 dairy imports into China are currently forecasted to be similar in terms of volume but higher prices and weak economic forecasts might lower that value.

On the dairy supply side, stocks, input prices and weather loom large. Recent cold storage reports indicate that stocks of butter and cheese increasing could help cap milk prices in 2023. Ramped up production in the second half of 2022 has stretched processing capacity in some regions, while labor issues continue to plague farms, haulers and processors. Added cheese production capacity means that exports will need to grow to balance that market in the coming years. With U.S. powder product and cheese prices competitive internationally, exports are likely to continue to expand depending on international demand.

Environmental policies in New Zealand and the EU may also damper supply response internationally. For example, the Netherlands aims to cut nitrogen emissions by 50% by 2030. With 1.6 million dairy cows, they are a major milk producer but will likely have to cut cow numbers by as much as 30% to meet their stated goals. However, farm profit margins were high in those countries to finish 2022, which encourages growth.

USDA is forecasting 2023 all milk price at $21.60/cwt. which is almost $4/cwt. below the 2022 all milk price of $25.55/cwt. At the same time, USDA is forecasting corn and soybean prices to remain near their 2022 values of $6.70/bu and $14.20/bu, respectively. Futures markets at the current time are consistent with the USDA forecast for milk price but expecting lower corn prices — closer to $6/bu — perhaps because energy and fuel prices have recently moderated. Feed prices in particular will be affected by global weather in 2023. The recent decline in fuel prices bodes well for fertilizer prices and acreage planted in the U.S. — but was it too late to help for 2023?

The first six months of 2023 are forecasted to continue La Nina Pacific Ocean currents which generally means drought in South America and the Southwest U.S. as well as wetter weather in the corn belt and northeast. However, models are increasingly forecasting a weakening of that current in the second half of 2023. If the currents change in the middle of the year, it could impact 2023 yields and resulting harvest.

Using the above values, the current 2023 IOFC forecast is $7.82/cwt., which would be a below average year (see Figure 1). Futures markets are efficient and unbiased estimators of milk and feed cost, but notoriously bad at predicting both supply and demand shocks. In particular, the supply factors discussed here will determine whether this forecast holds.

Policy Outlook

The current farm bill expires at the end of 2023, meaning discussions will ramp up this year resulting in either a new bill or an extension of the current legislation. While more than 70% of farm bill spending is for nutrition programs, there are several important agricultural commodity programs and dairy related issues. The Dairy Margin Coverage program (DMC) may be revisited as far as production history, Tier 1 limits and margin levels. The increasing cost of labor and energy certainly show that margins do not indicate the profit levels they once did. Dairy farms will also be interested in environmental programs which may enable and encourage investment in carbon capture technology.

Finally, it is likely that there will be movement on a Federal Milk Marketing Order hearing of some sort in the next year. Dairy farms and cooperatives from all regions seem to agree that Class I pricing and make allowances are in need of examination. Other potential topics include pooling rules and price discovery aspects. The Northeast perspective and voice will be important to arrive at an agreeable result.

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HIGHER FOOD INFLATION, SLOWING ECONOMY DAMPEN DAIRY DEMAND

Rob Fox, Director, Knowledge Exchange, CoBank

Average U.S. mailbox milk prices have dropped more than $6.00/cwt since peaking last May. While milk supply here and in Europe has been edging marginally higher since late 2022, we would argue that the price decline is largely due to broader economic factors that are limiting dairy demand both in the U.S. and abroad.

Looking first at the domestic market, which accounts for the vast majority of dairy offtake, consumers remain shell-shocked from food inflation which has outpaced disposable income gains for 18 straight months. And although broader measures of inflation have eased as of late, food-at-home inflation is still running above 8% annually, and retail dairy case inflation is above 10% (Exhibit 1). Farmgate commodity prices, including milk, peaked last summer and have been falling ever since – so what's going on?

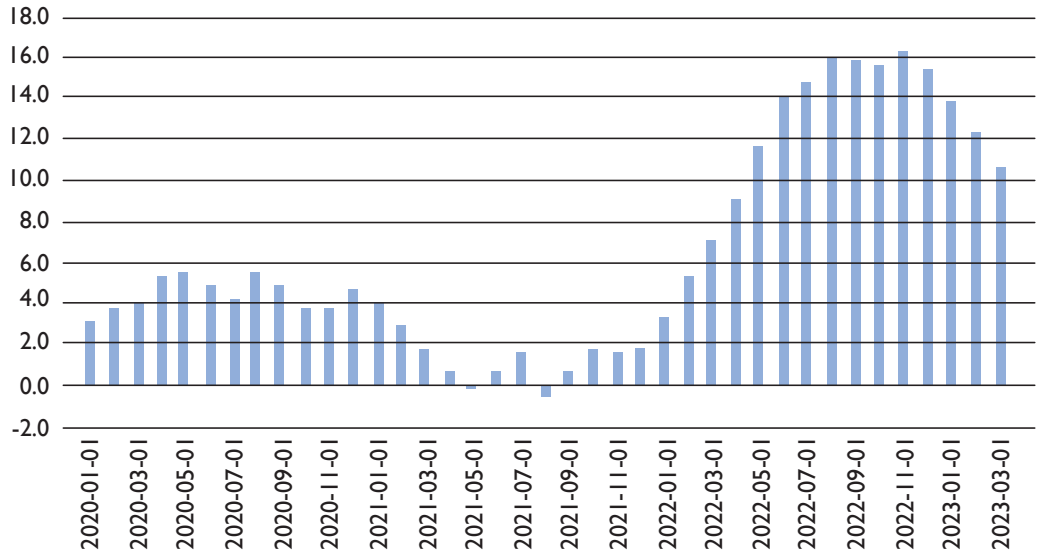
The Hidden Cost of High Retail Prices

Since the pandemic lockdowns of early 2020, food manufacturers have learned that higher profits are to be found in ever-higher retail prices despite having to put up with modest declines in unit volume sales. And, up until now, that has been the smart choice, but it has unfortunately led to lower consumption of dairy aisle products and consequently has put downward pressure on mailbox milk prices for producers. This is one of the reasons that overall U.S. dairy consumption declined 1.1% in 2022[1] after averaging 1.5% growth over the previous decade.

A recent report by the International Dairy Deli Bakery Association, Circana, and 210 Analytics laid bare the facts: For the 52 weeks ending April 2, 2023, price hikes led retail dairy sales to increase 18.3% in dollar value, but unit volume sales to decline 2.4%[2]. USDA's weekly retail grocery sales data from the beginning of the pandemic through the end of 2022 show that equivalent-volume unit sales (which also account for "shrinkflation" effects) have actually been trending lower since the early stages of the pandemic (Exhibit 2).

Exhibit 1

Retail Dairy: Consumer Price Inflation (%)

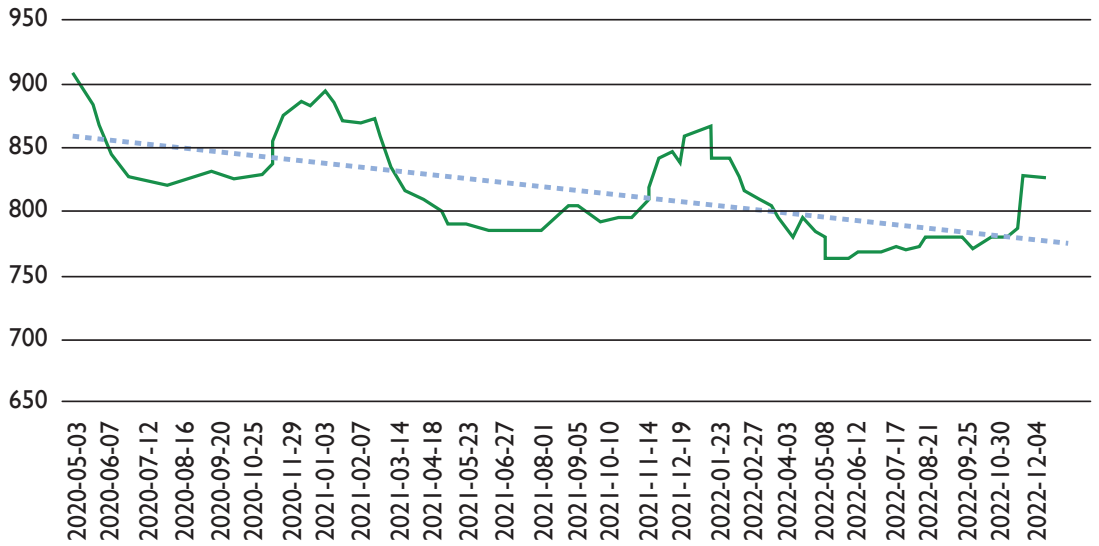


Sources: Bureau of Labor Statistics, Consumer Price Index for All Urban Consumers, USDA-ERS Weekly Retail Food Sales

[1]USDA, World Agricultural Supply and Demand Estimates, April 2023.
[2]https://www.linkedin.com/posts/anne-marie-roerink-58a5341_q1march-grocery-performance-activity-7054486389421142016-7dKY?utm_source=share&utm_medium=member_desktop

Exhibit 2

Retail Dairy: Combined Unit Sales (MM/Week)



Sources: Bureau of Labor Statistics, Consumer Price Index for All Urban Consumers, USDA-ERS Weekly Retail Food Sales

So while consumers have been trying to "push back" on price hikes by buying less, most major publicly traded food manufacturers (including Nestle, Unilever, and Danone) have recently stated that they will continue to hike prices as long as strong profit margins continue.

The Cold Economic Reality of 2023

While consumers have been able to hold their consumption levels reasonably stable thanks to pandemic-era savings, low debt levels and higher wage rates, economic conditions unfortunately appear to be deteriorating in 2023. GDP growth in Q1 dropped more than most expected – down to 1.6% vs 3.7% in Q1 last year. The other recent red flags of a weakening economy are too numerous to list but include consumer sentiment, rapidly falling trucking volumes, sharply tightening credit conditions, weaker new home construction, lower manufacturing orders, falling oil prices, a steep drop in ocean container movement, and so on.

Despite all of the above, the U.S. labor market has held up well thus far, but even there we see wage gains now slowing. Most economists believe the full effect of the Fed's interest rate hikes does not show up in employment numbers for at least 12 months, which means labor markets are just now showing the first responses to the steepest rate hike environment in decades. In other words, we will have to wait another year until we see the story play out. Perhaps the U.S. economy will have the "soft landing" Fed officials are hoping for, but that seems less and less plausible by the day.

Dairy Export Demand Weak but Showing Signs of Life

Generally speaking, the global economic outlook does not seem quite as negative. But Oxford Economics, a well-respected economic advisor, is forecasting real global GDP to grow by only 1.9% in 2023, down from 3.1% last year, and the lowest non-pandemic yearly pace since 2009 (Exhibit 3). The primary culprits are the relentless monetary tightening policies among central banks and weaker manufacturing expectations in Asia.

Per USDA, after enjoying strong annual growth rates between 2010 and 2019, global imports of both milk powder (SMP and WMP) and cheese have been essentially flat since 2020. The further COVID retreats in the rearview mirror, the more concerning that trend becomes. Over the past two years the U.S. has benefited from lower milk supplies coming out of Europe and New Zealand, which may have somewhat obscured weakening global dairy demand. And while we believe the

U.S. will be the primary source of global milk supply growth in the coming decades, it is unwise to discount Europe's milk production potential during high-price periods.

Exhibit 3

Global GDP Growth (%)

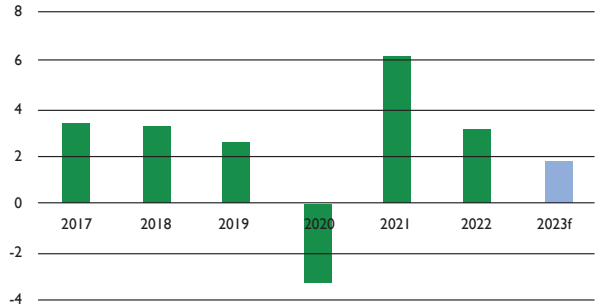
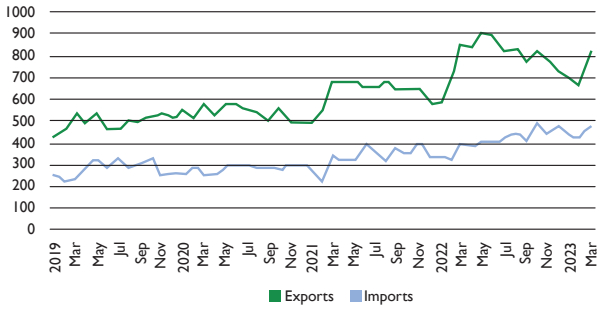


Exhibit 4

U.S. Dairy Trade (SMM)



Sources: Oxford Economics, USDA FAS GATS Database

U.S. dairy exports surged in early 2022, but had been trending lower since last May, both in volume and unit price (Exhibit 4). But the U.S. export numbers for March were big relative to recent months, with across the board volume gains by most destinations and many different product categories. Keep in mind that U.S. dairy imports (typically higher value cheeses, butter, and high protein powders) have also been trending higher over the past two years, so the growth in net dairy trade is not as great as it first appears.

Global Dairy Trade price indexes have been trending lower for the last 12 months. SMP/NDM took the worst of it, falling 40% from the highs of last June. However, prices for all the major categories have come off their lows in recent weeks, which could signal that the bottom has been set and higher prices are on the horizon. So, at least on the export side, things are looking less dire for dairy demand than they were just a few weeks ago.

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Mr. Fox earned a bachelor's degree in economics from Northwestern University and a master's degree in agricultural economics from the University of California, Davis.

REVIEW OF 2022 AND A LOOK AHEAD

Dr. Marin Bozic and Brian Walton, Bozic LLC

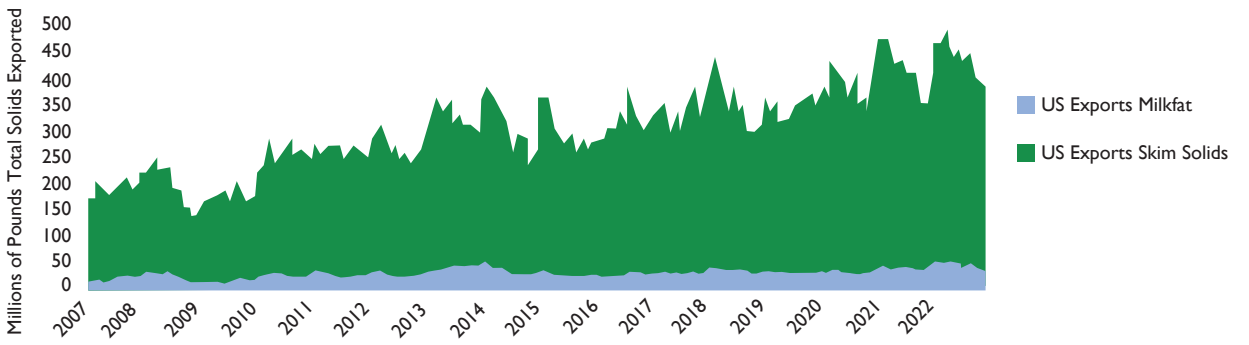
2022 U.S. Dairy Exports Hit Record

U.S. dairy exports hit new records in 2022, reaching 5.27 billion pounds of total solids exported (milkfat and skim solids content combined). This figure represents an increase of 5% from 2021, accounting for 17.8% of U.S. farm milk production. Mexico and Canada are the largest U.S. dairy export markets, representing over one-third of the $11 billion dollars of total U.S. dairy exports. China, Philippines, South Korea, Japan, Indonesia, Vietnam, and Malaysia collectively account for approximately another one-third of total U.S. dairy export value, while the remaining third is spread out across dozens of other countries. A major milestone was passed in 2021, with U.S. dairy export sales (on a total solids annual basis) surpassing total U.S. fluid milk sales for the first time, likely the culmination of a long-term industry trend. The increased importance of dairy exports for the U.S. has been building for a long time due to a variety of market and policy factors, including the continued fifty-year decline in U.S. fluid milk sales and the more recent trend of increasing demand for dairy and protein in foreign markets. Long-term per capita GDP growth in many emerging markets and more open trade policies have also played a role in boosting U.S. dairy exports. As a result, U.S. dairy manufacturers have focused more of their attention on dairy products that are in high demand in foreign markets (cheese, nonfat dry milk (NDM), high protein whey products, lactose, and other milk powders rather than fluid milk).

U.S. promotional checkoff efforts, along with fluid milk product development, have done little to curb the long-term decline in per capita fluid milk sales domestically. One potential contributing factor is the proliferation of beverage choices available to consumers, where sports drinks, plant-based products, juices, soft drinks and flavored waters compete with milk for market share. While shifting beverage consumption patterns have presented challenges for dairy farmers who are in heavy Class I utilization areas that have traditionally relied on fluid milk sales, new opportunities have also been created for U.S. dairy producers to expand their milk production and enter new markets. In the Northeast FMMO, Class I milk utilization has fallen from 44% in the year 2000 to 30% in 2022. This trend coincides with Northeast FMMO producer price differentials (PPD) generally drifting lower in the past twenty years, with average PPD from 2000 to 2009 being $1.86 per cwt. and from 2010 to present averaging $1.49 per cwt. Approximately one day's worth of U.S. farm milk production per week is currently being exported, which has roughly doubled over the past 15 years. Increasing U.S. dairy exports helps provide market outlets for the substantial U.S. milk production growth that would otherwise be difficult for domestic demand alone to absorb. Domestic demand for total milk solids has only grown by 1.2% on average annually in the past decade, while exports have increased an average of 5.2% annually. Additionally, U.S. population growth has been declining over the past few decades, with some estimates suggesting forward growth rates of only 0.4% to 0.5% annually. These figures highlight the increasing need for export growth. Going forward, it is expected that 40 to 60% of all additional US skim solids produced will need to be exported.

Exhibit 1

US Dairy Exports Total Sales



Data Source: USDA

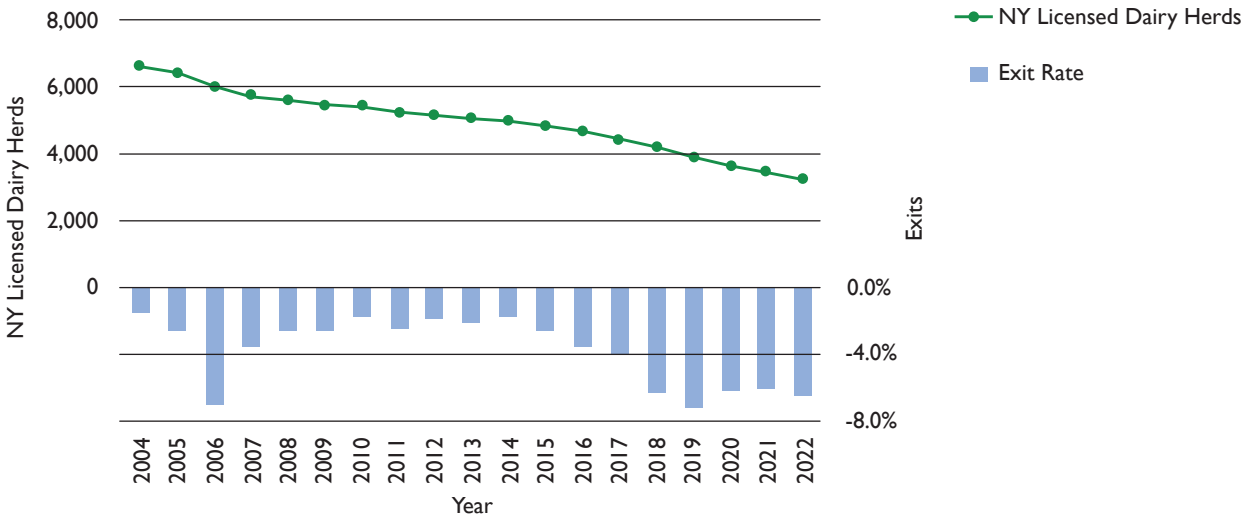
Rising Farm Exit Rates and Continued Consolidation

The dairy industry in the United States has generally experienced increasing annual exit rates for dairy farms in recent years, in part due to the "Baby Boom" generation reaching retirement and a lower desire among younger generations to take over family operations. Smaller operations continue to face challenging financial conditions, as economies of scale cannot be replicated for smaller herds. U.S. licensed dairy herds declined 6.4% in 2022 (to 27,932 operations), which is an acceleration of the 5.7% exit rate in 2021. Licensed dairy herds in New York dropped by 6.4% in 2022 (to 3,210 operations). Throughout the past 50 years in the U.S., the number of licensed dairy herds has declined by roughly half each decade. If this trend persists, U.S. operations could fall to around only 7,000 operations within 20 years. The inception of Dairy Margin Coverage (DMC) has partially offset the attrition rates of smaller farms, allowing smaller operations of less than 200 cows to remain more financially viable. DMC payments were roughly $2.59 per cwt. at the tier 1 coverage level ($9.50) in 2021 and only $0.19 per cwt. in 2022. DMC payments are forecast to be near $2.00 per cwt. in 2023. The upcoming Farm Bill will be critical in ensuring safety net programs (such as DMC) remain in place for dairy producers. The consolidation of the dairy industry remains a continuing trend as cost of production estimates suggest $2.00 to $4.00 per cwt. cost advantage for large dairy farm operations.

Most of the new dairy operations being built are centered around Texas, Kansas, South Dakota and Idaho. Meanwhile, cooperatives have diminished in importance as a primary engine for growth, as most new capacity in the next few years are private projects. In many cases, smaller producers currently have limited opportunities to grow as many processors and cooperatives are employing supply management or quota programs. The overall trend of increasing dairy farm exit rates raises concerns about the long-term viability of small dairy operations and the possible negative impact on rural communities as more farms consolidate.

Exhibit 2

NY Licensed Dairy Farms and Annual Exit Rate



Data Source: USDA

Record Butterfat Prices and Large Class IV Premium

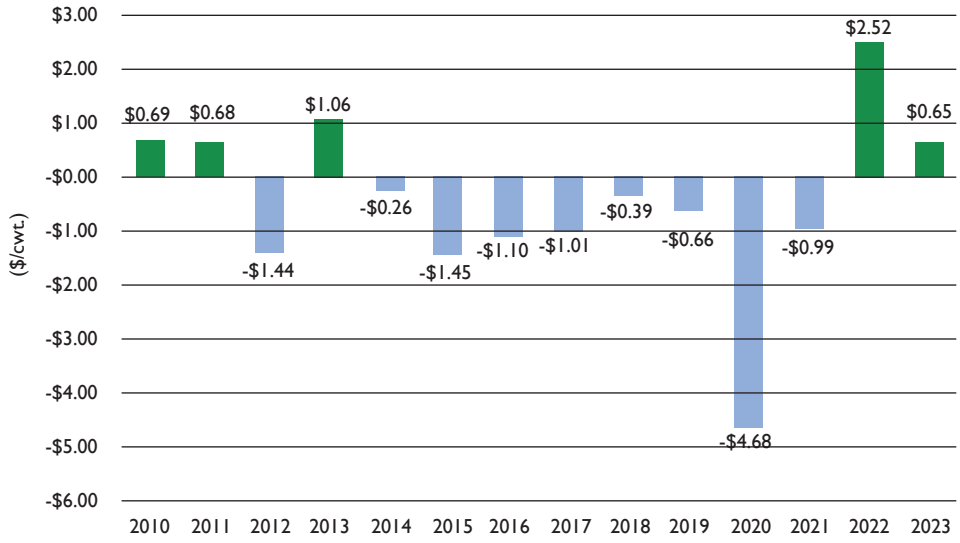
Butter prices in the United States reached record highs in 2022, averaging $2.86 per pound for the year with a peak of $3.27 per pound. Structural demand changes within the last decade place more emphasis on healthier fats, such as butter, likely contributing to these price increases. An increasingly negative stigma has been attached to vegetable oils and margarine for health-conscious consumers, while butter markets have benefitted from the switch to what are perceived as more wholesome sources of fat in consumer diets. Additionally, U.S. butter production has been lagging, with 2022 butter output declining 0.7% from 2021. New plant capacity seems to be more focused on cheese production at the expense of butter/powder plants. Dairy producers at the farm level have continued to respond to higher butterfat prices over the last ten years by formulating

feed rations to optimize fat content, with national average fat tests exceeding 4%. Class IV milk prices reached a new record high of $24.47/cwt, which was $2.52 above Class III milk prices during 2022. New York margins were strong overall in the first half of 2022 despite generally high operational costs.

Following large-scale trends in the overall economy, labor and general farm overhead costs continue to hit record levels as businesses struggle to find and retain workers. Higher feed costs in the past two crop years have also been challenging for many producers due to higher-than-normal drought impacts.

Exhibit 3

Annual Class IV Milk Price Minus Class III Milk Price



Key Trends

Economic Outlook 2023

Many economists and media articles have been predicting a U.S. recession since mid-2022 when the Federal Reserve began raising interest rates to combat inflation that was at its highest rate since the 1980s. In the span of just one year, the Federal Reserve raised the federal funds rate from near-0% to around 5%, marking one of the most aggressive Fed tightening cycles seen in the last forty years. Inflation exceeded 8% in 2022, sparking the Fed to dramatically shift its previous viewpoint that inflation was only transitory while recovering from the COVID-19 pandemic. The numerous recession predictions during the start of the tightening cycle were perhaps a bit premature, but a potential economic slowdown in 2023 is likely still imminent. However, current economic indicators are not quite at recession levels, with labor markets remaining strong and GDP likely remaining positive in Q1 2023. Still, it is important to note that every recession begins looking like a 'soft landing' before economic downturns become more widespread. In general, the composition of the U.S. economy is increasingly service based, which tends be less cyclical. Almost 87% of jobs are in service sectors, compared to only 13% for the manufacturing and construction sectors where most recession-related job losses come from.

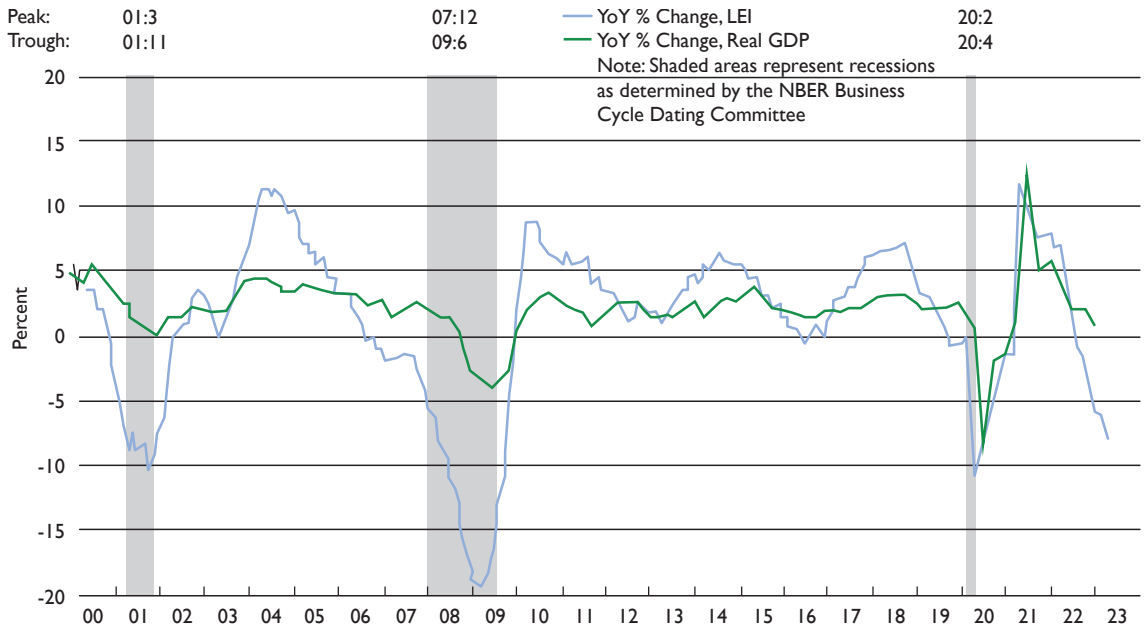
A few leading economic indicators have shown troubling signs over the past six months, with The Conference Board Leading Economic Index® forecasting mild recessionary levels. Leading indicators can show the direction or trend of the economy more clearly than employment or GDP numbers, which tend to lag and are often subject to revision.

Recent bank runs have also caused stress on the financial system, forcing the Treasury, the FDIC, and the Federal Reserve to act to shore up confidence in the system. Credit conditions will also likely tighten, which could cause a drag on consumer spending. Many smaller regional banks saw plummeting deposits while other alternatives, such as T-bills or money market accounts, offered superior interest rates near 5% over simply storing cash in a bank account near 0%. In addition, regional

banks are perceived to be less likely to be bailed out than the 'too big to fail' mega banks. The odds of a recession are certainly elevated for the remainder of 2023 compared to the baseline recession frequency of around 20% for any given year, with the consensus among economists placing the odds of a recession at around 50%. It is important to remember that unemployment is typically a lagging economic indicator that tends to rise more in the later stages of a recession. Thus, it is important to focus on leading indicators when forecasting a potential recession.

Exhibit 4

The Conference Board Leading Economic Index



Source: The Conference Board, *Bureau of Economic Analysis (BEA)

Risk Management for Dairy Producers

Proactive dairy producers that plan for risk management tend to outperform their peers and have a greater ability to expand their business. Risk management plans do not necessarily need to be complex to be successful. Rather, a consistent plan that holds producers accountable for actively managing their business risks is merely the most important element for success. Predicting the exact timing of price highs and lows within the dairy and feed markets is extremely difficult and should not be the primary goal of a risk management plan. In reality, the nature of commodity markets makes it impossible to know precisely what milk prices will be in six months or a year from now. Even market experts that frequently appear at conferences or in prominent dairy publications are typically no more accurate with their predictions than the current futures market prices. It is extremely difficult to predict with more accuracy than the collective wisdom of everyone participating in the futures market. Therefore, dairy producers' efforts are best focused on consistently managing risk and acting prudently when profitable margins can be protected. The most important part of risk management is to be proactive and have protections in place before a major crisis strikes, such as the pandemic or 2008/09 financial crisis. Consistent hedging with available tools such as DMC, DRP, LGM, and futures/options is one way to proactively secure protections. It is often too late to act when a crisis strikes, as the dairy futures and options markets rapidly react to heightened risk in milk prices. Consistent hedgers that layer over time are more likely to have coverage in place for a crisis and realize better results.

Dairy Margin Coverage (DMC) is a foundational tool of risk management, especially on the first five million pounds of production, with long-run estimated payments near $1.50 per cwt. annually. The next layer of tools include DRP and LGM

insurance with subsidized premiums, where coverage can act as a floor on milk revenue in which a producer is not giving away any potential upside but rather putting a minimum revenue level in place to protect from falling prices. However, it is also important to manage expectations when buying DRP and LGM insurance. Many of the larger indemnities come from rare events that occur once every three to five years and are nearly impossible to predict ahead of time. Thus, there will be many instances of paying insurance premiums without collecting indemnities in normal years, but without continuous coverage a crisis could be especially damaging. The DRP and LGM programs are designed and actuarially rated so that, with subsidized premiums, dairy producers are likely to have net positive indemnities (indemnities greater than premiums paid) in the long-run. The last pillar of risk management is futures, options, and forward contracting, which can be utilized in conjunction with other strategies. Some producers sell call options to cheapen the cost of DRP premiums while capping upside potential in milk revenue. Forward contracting or selling futures is another tool that could be used; however, it has the negative of not being subsidized and it also caps market upside potential.

Assuming that coverage is booked with consistent layering, the simulated average DRP returns for New York from 2011 to 2022 substantially outperform the strategy of selling Class III and Class IV futures. Assuming layering coverage for five quarters out on average in Class IV, DRP also resulted in a return of $0.41 per cwt. from 2011 to 2022 versus a $0.05 per cwt. return on simply selling Class IV milk futures. Likewise, Class III DRP resulted in a return of $0.01 per cwt. versus a -$0.60 per cwt. return on selling Class III milk futures.

Possible FMMO Reform and Impact for Producers

The Federal Milk Marketing Order (FMMO) system, which governs the pricing and marketing of milk in much of the United States, has faced several challenges and criticisms in recent years. The FMMO is a valuable program for dairy farmers that aims to provide orderly milk marketing and price transparency. The National Milk Producers Federation (NMPF) surveyed its members on FMMO issues, and they found that member co-ops overwhelmingly supported the federal order system but agreed that provisions need to be modernized. The major tenants of the recent NMPF proposal are analyzed below.

Make Allowances

Make allowances have been a difficult issue for the industry because they have a direct and immediate impact on Class pricing and producer milk checks. Make allowances are supposed to reflect the cost of manufacturing commodity dairy products while still leaving a return on investment after expenses for the manufacturer. The National Milk Producers Federation, NMPF, has proposed increasing the FMMO processor make allowances to the following: Cheese $0.2400 per pound, Dry Whey $0.2300, Butter $0.2100, and NFDM $0.2100. Make allowances were last increased in 2008, marking almost 15 years with no changes. Most agree this is an unacceptably long period of time without any adjustments. If implemented, these would decrease Class III milk by $0.58 and Class IV milk by $0.53 per cwt., assuming no changes in yield factors (i.e., the number of pounds it takes to convert milk into commodity dairy products). The primary dairy processors selling commodity style products (cheddar cheese, NDM, sweet whey, and bulk butter) that are captured in the NDPSR report are most negatively affected by the lack of increases to make allowances. Other dairy sellers can simply increase the price of their products to compensate for higher manufacturing costs. Additionally, steep discounts in barrel cheese prices over the last five years have padded cheese producer make allowances, because cheese producers pay for milk on a 50/50 split between blocks and barrels and mostly sell against the block cheese market, pushing up margins by on average close to $0.04 per pound because of the barrel discount.

NMPF wants to develop a process to ensure manufacturing allowances are reviewed more frequently. A survey process every several years could serve to streamline the arduous current process and likely make future adjustments more tolerable as opposed to a sharp dramatic increase every decade.

Make Allowances	Current FMMO Make Allowances	NMPF Proposed New Make Allowances	Change
Nonfat Dry Milk	$0.1678	$0.2100	$0.0422
Butter	$0.1715	$0.2100	$0.0385
Cheese	$0.2004	$0.2400	$0.0396
Dry Whey	$0.1991	$0.2300	$0.0309

Components	Current Make Allowances	NMPF Proposed New Make Allowances	Change
Nonfat Solids	$1.47	$1.42	-$0.042
Other Solids	$0.52	$0.49	-$0.032
Butterfat	$2.96	$2.91	-$0.047
Protein	$2.36	$2.28	-$0.079
Typical Northeasat Dariy Near Average Tests $/cwt			-$0.640

Revert Back to Higher of Class I Mover

NMPF also wants to revert back to the "higher-of" in the Class I mover in place before 2019. The industry was mostly in favor of the "average of Class III and Class IV" mover until a period of abnormal dairy price spreads caused the industry to panic. Many producers were angered as a result of the impact of the Farmers to Families Food Box program. Class III milk prices increased dramatically due to heightened government cheese purchasing, while Class IV milk prices lagged behind. This resulted in sharply negative PPD in milk checks during 2020. The "higher of" switch complicates hedging for fluid milk buyers, but this factor alone has had little impact on fluid milk sales at restaurant chains. The pendulum has swung back in favor of "higher of" Class I milk mover, and this will likely help to slightly bolster prices for a Northeast dairy producer.

Discontinue Barrel Cheese Price and Update Milk Component Factors

NMPF wants to discontinue the use of barrel cheese in the protein component price formula. The barrel cheese market has had an outsized influence on regulated Class III milk prices, where current rules assign roughly a 50/50 split between blocks and barrels when determining average cheese prices. In reality, most formula-based cheese prices reference the CME block market, with some industry analysis suggesting around 80% of all cheese is based on the block cheddar market. Removing barrels from the price formulas would likely provide a more accurate reflection of market conditions for most cheesemakers. It would also aid regulated producer milk prices, as the barrel price has tended to trade at a large discount compared to the block cheese market in previous years.

NMPF is also considering updating the milk component factors for protein, nonfat solids, and other solids in the Class III and Class IV skim price formulas. The average farm butterfat and protein tests have risen considerably over the years as improved herd management, better cow genetics, and more optimized feed rations have boosted component levels. An increase to 4.0% butterfat and 3.3% protein appears to be the new benchmark for the industry. This change serves more as an accounting exercise than a meaningful change in policy, but it does makes things a bit easier to benchmark for a typical representative farm component test.

Class I Price Surface

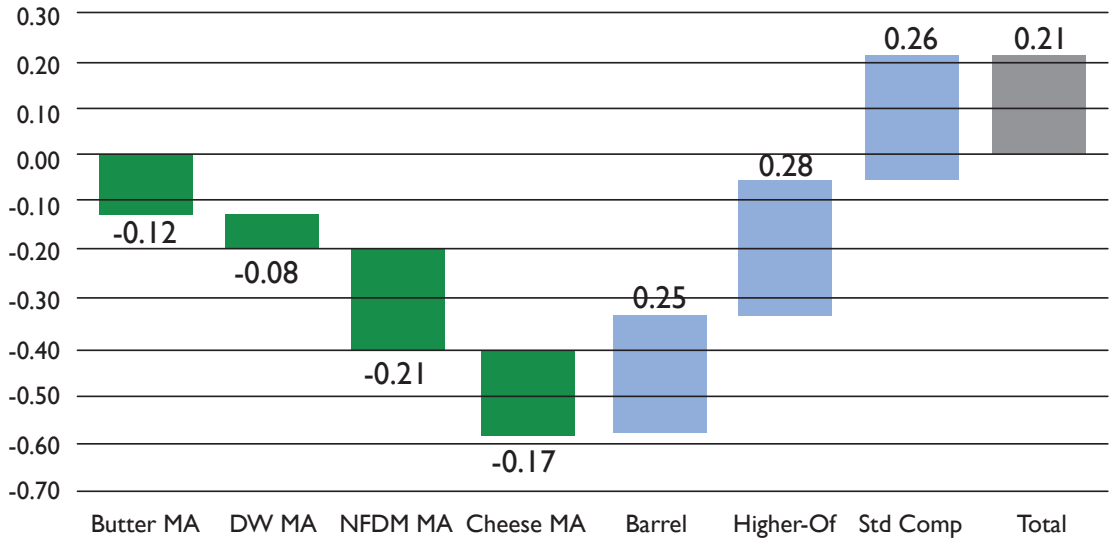
NMPF wants to update the current nationwide FMMO Class I price surface by an average of $1.48 across all orders (to $4.07 per cwt.). The Northeast region has a slated increase of $1.76 (to $4.64 per cwt.). The rationale behind such changes is the increasing cost to deliver bulk milk to fluid processing plants. As a result, the current Class I differentials have become increasingly inadequate to effectively supply milk for fluid use, thereby creating disorderly marketing conditions. The increase in the Class I milk price surface would offset a significant amount of the decline from the increase in processor make allowances.

Next Steps and Overall Producer Milk Check Impact

A hearing process will likely take place on FMMO reform in 2023. The last major changes in 2008 took nearly two years to implement. The estimated price impacts for a typical Northeast dairy producer at average components from various rule changes are: -$0.12 on butter make allowance, -$0.08 on dry whey make allowance, -$0.21 on NDM make allowance, -$0.17 on cheese make allowance, +$0.25 on removing barrel cheese, +$0.28 on the Higher of Class I mover, +$0.26 on standard components, and a total result of $+0.21 per cwt.. These figures do not include the adjusted Class I price surface rule, which likely would boost price on average by about another $0.50 per cwt. for the Northeast producer.

Exhibit 5

Northeast FMMO - 3/2020 – 2/2023



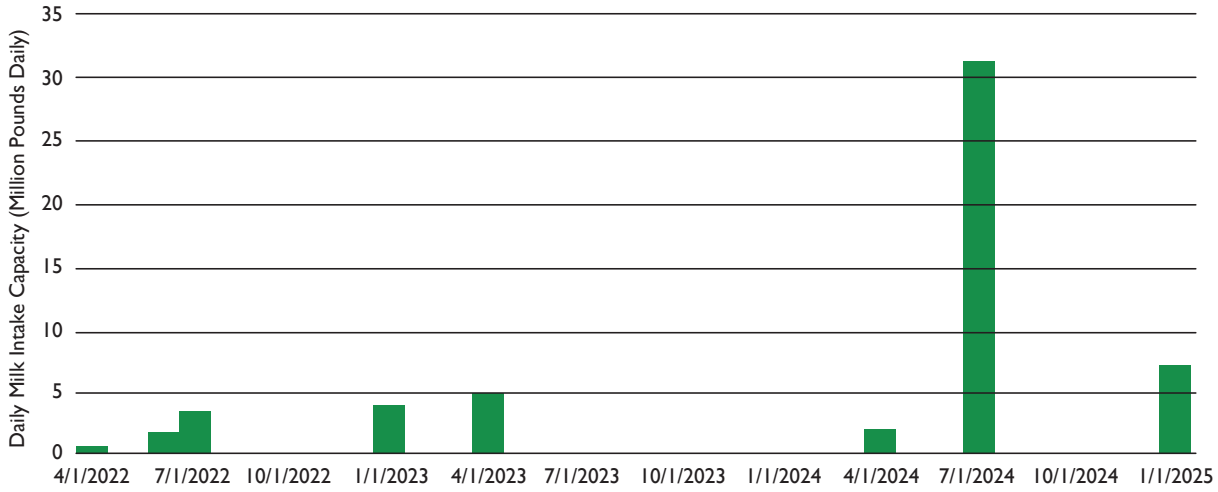
Milk Plant Capacity and Vertical Integration

Milk plant capacity growth is increasingly driven by groups of large dairy producers through private projects, with a limited appetite for expanding milk plant capacity from cooperatives. Large family dairy operations are increasingly involved in new processing plants to grow milk production, adopting a more vertical integration process like the pork, cattle, and poultry sectors. This approach allows companies/farms to capture a larger share of the value chain, as they can more easily manage the quality and cost of raw materials, streamline production processes, and have greater control over product pricing and distribution. It allows for greater efficiency in operations, as well as the ability to respond more quickly to changes in the market. Many cooperative milk handlers have put quotas or limits on milk production growth, so producers are striking out on their own to make these investments which are often in fringe FMMO areas. A sizeable jump in U.S. milk plant capacity is expected in about 18 months, coming after a relatively quiet period of plant expansion during 2022/23. Major plant expansions could bolster U.S. dairy processing capacity by 11 billion milk pounds annually, or almost 5% greater than 2023

capacity in the latter half of 2024 and early 2025. The Dodge City, KS cheese plant, the Lubbock, TX cheese plant, and the Pasco, WA plant, along with numerous other smaller expansions are expected in 2024. States with friendlier land permitting and favorable business climates have seen the majority of growth, with Texas, Kansas, Idaho, South Dakota leading the way. It is critical that U.S. dairy exports continue their upward trajectory in the wake of these capacity expansions. Europe and New Zealand are facing major production hurdles in the long-term due to climate initiatives and limited land capacity, potentially opening the door for the U.S. to be a primary supplier in global dairy markets.

Exhibit 6

Projected New Dairy Plant Capacity Milk Dairy Intakes (Million Pounds)



Data Source: McCully Group, Bozic Estimates

Exhibit 7

Major Dairy Plant Investments 2022-2025

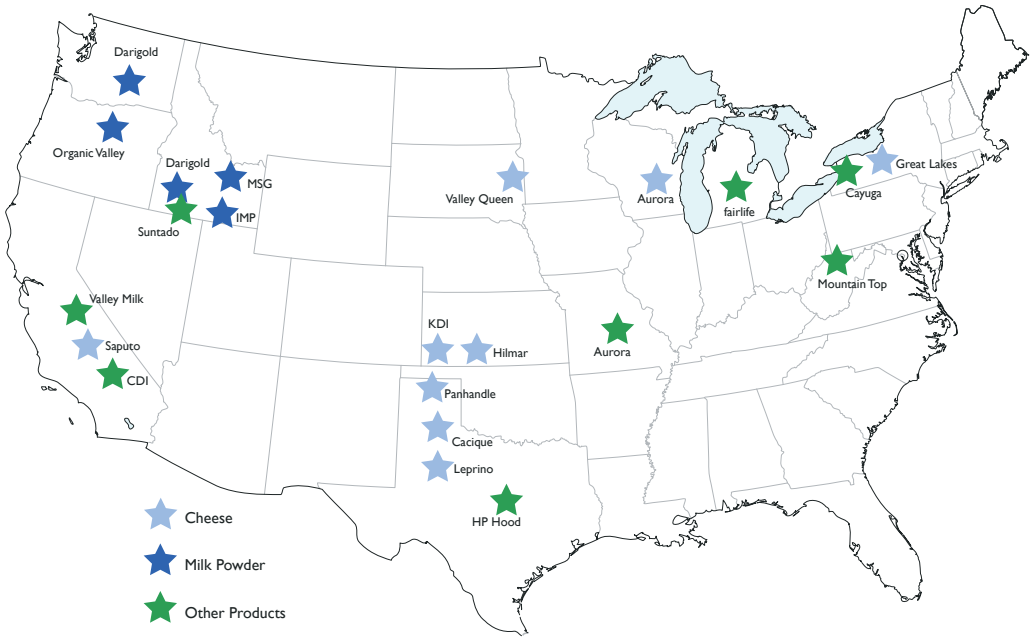


Chart Source:McCully Group

Dr. Marin Bozic is the founder and CEO of Bozic LLC, a global provider of technology solutions for commodity markets analytics and designer of three major livestock insurance programs in the United States - Dairy Revenue Protection, Livestock Gross Margin and Livestock Risk Protection. Dr. Bozic also currently serves on faculty in the Department of Applied Economics at the University of Minnesota. Marin's research program covers dairy markets and policy and livestock risk management. Dr. Bozic is a board advisor to Edge Dairy Farmer Cooperative and a nationally popular consultant and speaker on economics of dairy markets and policy issues.

Brian Walton is an economist and research specialist with Bozic LLC. Brian's research specializes in data analysis, consulting, and risk management in the dairy and grain sectors. Prior to joining the company, Brian worked at IHS Markit as a feed ingredients and dairy market analyst. Brian earned his undergraduate degree from the University of Minnesota in applied economics.

FINANCIAL RECORDS

The following seven tables present detailed financial data from this summary. These tables are organized into two sets:

- Tables A-1 through A-5 are **COMPARISONS BETWEEN YEARS**
- Tables B-1 through B-3 are **DATA BY HERD SIZES**

Each set includes a condensed earnings worksheet, a balance sheet summary and a page of evaluation factors. The 2018-to-2022 data series includes farms in Connecticut, Maine, New Hampshire, New York and Vermont. A majority of the farms are from New York.

Please note the following in order to properly use this data:

- Cattle purchased for replacements are considered operating expenses, but cattle purchased for expansion are capital purchases. The accrual adjustment change in the inventory of raised livestock is calculated by subtracting purchases for expansion from the total increase in cattle inventory value.
- Depreciation has been restated by applying a standard percentage of depreciation to various asset classes in order to compare consistent numbers from year to year and avoid variations driven by changes in tax laws.
- Incorporated farms were adjusted to sole proprietor status, and owner draw was recorded as Family Living Expense. If there was more than one owner, the largest draw was recorded as Family Living, and other owner salaries were recorded under Hired Labor.
- Appreciation and revaluation of capital assets do not appear in the earnings statements. They are, however, included on the balance sheets.
- Current liabilities on the balance sheet include both current debts as well as the current portion of intermediate-term and long-term liabilities.
- Government payments include state program payments and those from USDA programs. Crop insurance indemnities are recorded as Crop Revenue.

Your Farm Credit team of ag finance specialists encourages you to review the following financial data thoughtfully and thoroughly. It allows you to identify your strengths and weaknesses and to improve your operation for the future.

TABLE A-1.

COMPARISON BETWEEN YEARS / Earnings Worksheet

	2018	2019	2020	2021	2022
Number of Farms	305	267	204	164	139
Average Number of Cows	478	600	685	568	821
Receipts					
Milk Sales	$2,076,327	$2,966,932	$3,277,366	$2,823,528	$5,423,526
Cattle Sales	143,115	173,905	222,798	178,352	325,937
Crop Sales	61,039	61,240	86,660	131,208	188,009
Government Payments	45,007	59,904	387,006	114,168	74,711
Other	83,936	101,902	121,123	116,440	209,355
CASH RECEIPTS	$2,409,424	$3,363,883	$4,094,953	$3,363,696	$6,221,538
Accrual Adjustments					
+ Change in Inventory-Raised Livestock	$30,251	$31,735	$43,538	$1,136	$4,926
VALUE OF FARM PRODUCTION (a)	$2,439,675	$3,395,618	$4,138,491	$3,364,832	$6,226,464
COST OF GOODS SOLD					
Chemicals & Sprays	$22,642	$30,463	$40,486	$29,536	$56,649
Custom Hire	88,371	125,235	146,854	89,176	165,842
Purchased Feed	779,129	974,821	1,176,693	1,012,176	1,635,432
Fertilizer & Lime	57,980	65,732	86,408	100,536	216,744
Freight & Trucking (Marketing)	137,634	176,247	216,074	189,144	289,813
Gasoline, Fuel & Oil	83,120	97,545	85,308	98,832	254,510
Hired Labor	384,723	504,463	593,447	502,112	629,707
Seed & Plants	56,312	67,810	87,770	64,752	116,852
Supplies	107,725	142,134	164,164	138,024	260,257
Veterinary, Medicine & Breeding	90,583	117,363	133,869	110,760	146,959
Cow Replacements	1,161	3,028	11,897	6,248	54,186
Total Cost of Goods Sold	$1,809,380	$2,304,841	$2,742,970	$2,341,296	$3,826,951
Gross Margin	$630,295	$1,090,777	$1,395,521	$1,023,536	$2,399,513
OVERHEAD					
Insurance	28,990	36,247	40,344	44,304	87,026
Interest	91,889	124,507	101,153	87,472	171,589
Rent	50,921	78,175	95,207	57,936	95,236
Repairs	136,172	187,387	266,248	208,456	363,703
Property & Misc. Taxes	34,090	45,177	47,416	43,736	78,816
Utilities	46,135	52,370	59,696	62,480	113,298
Other	48,118	48,600	65,418	56,800	201,966
Accrual Adjustments					
+ Depreciation	154,112	186,303	204,913	191,416	369,450
Total Overhead Expenses	$590,427	$758,766	$880,395	$752,600	$1,481,084
Total Farm Production Costs (b)	$2,399,807	$3,063,607	$3,623,365	$3,093,896	$5,308,035
NET FARM EARNINGS (a) - (b)	$39,868	$332,011	$515,126	$270,936	$918,429
- Family Living & Income Taxes	58,815	62,963	60,795	58,504	142,854
NET EARNINGS	**-$18,947**	**$269,048**	**$454,331**	**$212,432**	**$775,575**
+ Net Nonfarm Income	15,660	13,357	13,063	22,720	48,439
NET HOUSEHOLD INCOME	-$3,287	$282,405	$467,394	$235,152	$824,014

Note: Expenses are adjusted for changes in accounts payable, prepaid expenses, and supply inventories to remove the effects of tax planning and reflect only 1 year's expenses.

TABLE A-2.

COMPARISON BETWEEN YEARS / Earnings Worksheet Per Cwt.

	2018	2019	2020	2021	2022
Number of Farms	305	267	204	164	139
Average Number of Cows	478	600	685	568	821
Receipts			DOLLARS PER CWT. OF MILK		
Milk Sales	$17.19	$19.18	$18.48	$19.21	$26.66
Cattle Sales	1.18	1.12	1.25	1.22	1.60
Crop Sales	0.51	0.40	0.49	0.89	0.92
Government Payments	0.37	0.39	2.18	0.78	0.37
Other	0.70	0.65	0.69	0.79	1.03
CASH RECEIPTS	$19.95	$21.74	$23.09	$22.89	$30.58
Accrual Adjustments					
+ Change in Inventory-Raised Livestock	$0.25	$0.21	$0.25	$0.01	$0.02
VALUE OF FARM PRODUCTION (a)	$20.20	$21.95	$23.34	$22.90	$30.60
COST OF GOODS SOLD					
Chemicals & Sprays	$0.19	$0.20	$0.23	$0.20	$0.28
Custom Hire	0.73	0.81	0.83	0.61	0.82
Purchased Feed	6.45	6.30	6.64	6.90	8.04
Fertilizer & Lime	0.48	0.42	0.49	0.69	1.07
Freight & Trucking (Marketing)	1.14	1.14	1.22	1.29	1.42
Gasoline, Fuel & Oil	0.69	0.63	0.48	0.67	1.25
Hired Labor	3.19	3.26	3.35	3.42	3.10
Seed & Plants	0.47	0.44	0.50	0.44	0.57
Supplies	0.89	0.92	0.93	0.94	1.28
Veterinary, Medicine & Breeding	0.75	0.76	0.76	0.76	0.72
Cow Replacements	0.01	0.02	0.07	0.04	0.27
Total Cost of Goods Sold	$14.99	$14.90	$15.50	$15.96	$18.82
Gross Margin	$5.21	$7.05	$7.84	$6.94	$11.78
OVERHEAD					
Insurance	0.24	0.23	0.23	0.30	0.43
Interest	0.76	0.80	0.57	0.60	0.84
Rent	0.42	0.51	0.54	0.40	0.47
Repairs	1.13	1.21	1.50	1.42	1.79
Property & Misc. Taxes	0.28	0.29	0.27	0.30	0.39
Utilities	0.38	0.34	0.34	0.43	0.56
Other	0.40	0.31	0.34	0.38	0.99
Accrual Adjustments					
+ Depreciation	1.28	1.20	1.16	1.31	1.82
Total Overhead Expenses	$4.89	$4.89	$4.95	$5.14	$7.29
Total Farm Production Costs (b)	$19.88	$19.79	$20.45	$21.10	$26.11
NET FARM EARNINGS (a) - (b)	$0.32	$2.16	$2.89	$1.80	$4.49
- Family Living & Income Taxes	0.48	0.41	0.34	0.40	0.70
NET EARNINGS	**-$0.16**	**$1.75**	**$2.55**	**$1.40**	**$3.79**
+ Net Nonfarm Income	0.13	0.09	0.07	0.16	0.24
NET HOUSEHOLD INCOME	-$0.03	$1.84	$2.62	$1.56	$4.03

Note: Expenses adjusted for changes in accounts payable, prepaid expenses and supply inventories to remove the effects of tax planning and reflect only one year's expenses.

TABLE A-3.

COMPARISON BETWEEN YEARS / Balance Sheet Summary

	2018	2019	2020	2021	2022
Number of Farms	305	267	204	164	139
Average Number of Cows	478	600	685	568	821
			DOLLARS PER FARM		
Assets					
Livestock	$1,023,346	$1,307,664	$1,499,770	$1,170,080	$1,751,193
Feed & Crops	567,738	672,930	775,267	731,584	1,233,142
Machinery & Equipment	994,758	1,107,211	1,284,178	1,284,248	2,774,159
Farm–Land & Buildings	2,612,937	3,296,203	3,633,060	3,527,848	5,091,021
All Other	750,839	1,046,802	1,493,164	1,255,848	2,924,402
TOTAL ASSETS	5,949,618	7,430,810	8,685,439	7,969,608	13,773,917
TOTAL LIABILITIES	2,034,833	2,436,846	2,726,987	2,653,696	4,269,200
TOTAL NET WORTH	$3,914,785	$4,993,964	$5,958,452	$5,315,912	$9,504,717
			DOLLARS PER COW		
Assets					
Livestock	$2,141	$2,179	$2,189	$2,060	$2,133
Feed & Crops	1,188	1,122	1,132	1,288	$1,502
Machinery & Equipment	2,081	1,845	1,875	2,261	$3,379
Farm-Land & Buildings	5,466	5,494	5,304	6,211	$6,201
All Other	1,571	1,745	2,180	2,211	$3,562
TOTAL ASSETS	12,447	12,385	12,679	14,031	16,777
TOTAL LIABILITIES	4,257	4,061	3,981	4,672	5,200
TOTAL NET WORTH	$8,190	$8,323	$8,698	$9,359	$11,577
			DOLLARS PER CWT. OF MILK		
Assets					
Livestock	$8.47	$8.45	$8.46	$7.98	$8.61
Feed & Crops	4.70	4.35	4.37	4.99	$6.06
Machinery & Equipment	8.24	7.16	7.24	8.76	$13.64
Farm–Land & Buildings	21.64	21.31	20.49	24.06	$25.03
All Other	6.22	6.77	8.42	8.56	$14.38
TOTAL ASSETS	$49.27	$48.04	$48.99	$54.34	$67.72
TOTAL LIABILITIES	16.85	15.75	15.38	18.09	20.99
TOTAL NET WORTH	$32.42	$32.28	$33.61	$36.25	$46.73
PERCENT NET WORTH	66%	67%	69%	67%	69%

TABLE A-4.

COMPARISON BETWEEN YEARS / Evaluation Factors

	2018	2019	2020	2021	2022
Number of Farms	305	267	204	164	139
Average Number of Cows	478	600	685	568	821
Worker Equivalents	9.6	11.6	12.7	10.9	14.6
Cows Per Worker	50	52	54	52	50
Pounds of Milk Sold Per Worker	1,255,688	1,337,028	1,391,525	1,343,002	1,254,778
Pounds of Milk Sold	12,076,192	15,469,414	17,728,029	14,665,582	20,340,275
Pounds of Milk Sold Per Cow	25,264	25,793	25,884	25,823	24,775
Milk Price Per Cwt.	$17.19	$19.18	$18.48	$19.21	$26.66
Total Crop Acres	1,009	1,194	1,314	1,240	1,157
Crop Acres Per Cow	2.1	2.0	1.9	2.2	1.9
Feed Cost Per Cow	$1,630	$1,625	$1,718	$1,782	$1,992
Feed as a Percent of Milk Sales	38%	33%	36%	36%	30%
Feed & Crop Expense Per Cow*	$1,916	$1,898	$2,031	$2,125	$2,468
Feed & Crop Expense Per Cwt.	$7.59	$7.36	$7.85	$8.23	$9.91
Machinery Costs Per Cow**	$966	$837	$853	$874	$1,246
Machinery Costs Per Cwt.	$3.83	$3.24	$3.30	$3.38	$5.16
Labor & Family Living Per Cow	$928	$941	$952	$983	$937
Labor & Family Living Per Cwt.	$3.67	$3.65	$3.68	$3.81	$3.81
Assets Per Cow	$12,447	$12,385	$12,679	$14,031	$16,777
Debt Per Cow	$4,257	$4,061	$3,981	$4,672	$5,200
Net Worth Per Cow	$8,190	$8,323	$8,698	$9,359	$11,577
Percent Net Worth	66%	67%	69%	67%	69%

*Feed & Crop Expense = Feed + Seed & Plants + Fertilizer + Chemicals & Spray.

**Machinery Costs = Machinery Repairs + Fuel & Oil + Custom Hire + Machinery & Equipment Depreciation.

TABLE B-1.

2022 DATA BY HERD SIZE / Earnings Worksheet

	299 COWS OR FEWER	300-699 COWS	700 COWS OR MORE	ALL FARMS
Number of Farms	33	38	68	139
Average Number of Cows	155	466	1,841	821
Receipts		DOLLARS PER COW		
Milk Sales	$5,969	$6,723	$7,127	$6,606
Cattle Sales	444	356	390	397
Crop Sales	327	298	63	229
Government Payments	138	83	51	91
Other	267	235	264	255
CASH RECEIPTS	$7,146	$7,695	$7,895	$7,579
Accrual Adjustments				
+ Change in Inventory-Raised Livestock	$11	-$15	$21	$6
VALUE OF FARM PRODUCTION (a)	$7,157	$7,680	$7,916	$7,584
COST OF GOODS SOLD				
Chemicals & Sprays	$53	$86	$69	$69
Custom Hire	181	184	241	202
Purchased Feed	1,525	2,174	2,278	1,992
Fertilizer & Lime	313	279	199	264
Freight & Trucking (Marketing)	284	376	398	353
Gasoline, Fuel & Oil	335	320	276	310
Hired Labor	508	815	977	767
Seed & Plants	116	176	135	142
Supplies	356	344	251	317
Veterinary, Medicine & Breeding	150	176	210	179
Cow Replacements	174	15	9	66
Total Cost of Goods Sold	$3,995	$4,945	$5,043	$4,661
Gross Margin	$3,161	$2,735	$2,873	$2,923
OVERHEAD				
Insurance	125	103	89	106
Interest	229	203	195	209
Rent	126	107	115	116
Repairs	480	436	412	443
Property & Misc. Taxes	127	96	65	96
Utilities	151	142	120	138
Other	382	150	207	246
Accrual Adjustments				
+ Depreciation	616	430	304	450
Total Overhead Expenses	$2,237	$1,667	$1,507	$1,804
Total Farm Production Costs (b)	$6,232	$6,612	$6,550	$6,465
NET FARM EARNINGS (a) - (b)	$925	$1,068	$1,366	$1,120
- Family Living & Income Taxes	339	132	52	174
NET EARNINGS	**$586**	**$936**	**$1,314**	**$945**
+ Net Nonfarm Income	120	44	13	59
NET HOUSEHOLD INCOME	$705	$980	$1,327	$1,004

Note: Expenses adjusted for changes in accounts payable, prepaid expenses, and supply inventories to remove the effects of tax planning and reflect only one year's expenses.

TABLE B-2.

2022 DATA BY HERD SIZE / Balance Sheet Summary

	299 COWS OR FEWER	300-699 COWS	700 COWS OR MORE	ALL FARMS
Number of Farms	33	38	68	139
Average Number of Cows	155	466	1,841	821
		ASSETS PER COW		
Cash & Accounts Receivable	$1,083	$859	$947	$963
Feed & Crop Inventory	1,689	1,501	1,316	1,502
Supplies & Prepaid Expenses	274	281	361	305
Other Current Assets	330	137	123	197
TOTAL CURRENT ASSETS	$3,375	$2,778	$2,747	$2,967
Dairy Livestock	$2,072	$1,996	$2,330	$2,133
Machinery & Equipment	5,087	3,143	1,908	3,379
Other Intermediate Assets	1,601	1,059	883	1,181
TOTAL INTERMEDIATE ASSETS	$8,760	$6,198	$5,121	$6,693
Farm Real Estate	$7,766	$5,316	$5,521	$6,201
Other Fixed Assets	1,181	743	826	917
TOTAL FIXED ASSETS	$8,947	$6,059	$6,347	$7,118
TOTAL ASSETS	$21,082	$15,035	$14,215	$16,777
		LIABILITIES PER COW		
Accounts Payable	$108	$110	$131	$116
Farm Credit Short-Term Loans	100	102	142	115
Other Current Liabilities	724	580	712	672
TOTAL CURRENT LIABILITIES	$933	$792	$985	$903
Farm Credit Intermediate Term	$1,615	$1,597	$1,759	$1,657
Other Intermediate Liabilities	579	414	286	426
TOTAL INTERMEDIATE LIABILITIES	$2,193	$2,011	$2,045	$2,083
Farm Credit Long-Term Real Estate	$1,933	$1,660	$1,890	$1,828
Other Long-Term Liabilities	694	312	152	386
TOTAL LONG-TERM LIABILITIES	$2,627	$1,972	$2,042	$2,214
TOTAL LIABILITIES	$5,753	$4,775	$5,072	$5,200
		NET WORTH PER COW		
OWNER'S NET WORTH	$15,329	$10,260	$9,143	$11,577
TOTAL LIABILITIES & NET WORTH	$21,082	$15,035	$14,215	$16,777
PERCENT NET WORTH	73%	68%	64%	69%

TABLE B-3.

2022 DATA BY HERD SIZE / Evaluation Factors

	299 COWS OR FEWER	300-699 COWS	700 COWS OR MORE	ALL FARMS
Number of Farms	33	38	68	139
Average Number of Cows	155	466	1,841	821
Worker Equivalents	4.1	8.8	30.8	14.6
Cows Per Worker	36	53	60	50
Pounds of Milk Sold Per Worker	806,642	1,350,611	1,607,082	1,254,778
Pounds of Milk Sold Per Farm	3,565,328	11,939,401	49,482,055	20,340,275
Pounds of Milk Sold Per Cow	21,821	25,621	26,882	24,775
Milk Price Per Cwt.	$26.90	$26.20	$26.41	$26.66
Total Crop Acres	360	848	2,262	1,157
Crop Acres Per Cow	2.6	1.8	1.2	1.9
Crop Acres Per Worker	90	96	73	86
Feed Cost Per Cow	$1,525	$2,174	$2,278	$1,992
Feed Cost Per Cwt.	$6.98	$8.49	$8.47	$7.98
Feed as a Percent of Milk Sales	26%	32%	32%	30%
Feed & Crop Expense Per Cow[1]	$2,006	$2,715	$2,682	$2,468
Feed & Crop Expense Per Cwt.	$9.15	$10.60	$9.98	$9.91
Machinery Cost Per Cow[2]	$1,455	$1,215	$1,067	$1,246
Machinery Costs Per Cwt.	$6.76	$4.74	$3.97	$5.16
Labor & Family Living Per Cow	$844	$943	$1,024	$937
Labor & Family Living Per Cwt.	$3.93	$3.68	$3.81	$3.81
Assets Per Cow	$21,082	$15,035	$14,215	$16,777
Debt Per Cow	$5,753	$4,775	$5,072	$5,200
Net Worth Per Cow	$15,329	$10,260	$9,143	$11,577
Return on Assets[3]	3.9%	7.6%	10.6%	6.9%
Return on Equity[4]	3.8%	9.1%	14.4%	8.2%

[1]Feed & Crop Expense = Feed + Seed & Plants + Fertilizer + Chemicals & Sprays.
[2]Machinery Cost = Machinery Repairs + Custom Hire + Fuel & Oil + Machinery & Equipment Depreciation.
[3]Return on Assets = (Net Earnings + Interest) ÷ Average Farm Assets.
[4]Return on Equity = Net Earnings ÷ Average Farm Net Worth.

GLOSSARY

Net Cash Farm Income

A measure of farm profitability in terms of cash flow and net cash farm income, reflects the ability of a farm business to meet its cost of production through cash income. It is equal to:

Cash Receipts — Adjusted Cash Operating Expenses

Accrual Adjusted Operating Expenses

Farm operating expenses adjusted to reflect 12 months of operation and to remove the effect of tax planning. Adjustments account for changes in supply inventories, accounts payable and prepaid expenses. Operating expenses do not include family living costs or capital expenditures.

Net Household Income

An accrual measure of overall household earnings, reflecting all revenues and costs, including both farm and non-farm sources. It is equal to:

Net Cash Farm Income
+ Change in Accounts Receivable
+ Change in Production Inventories
+ Net Nonfarm & Noncash Income
- Depreciation
- Family Living Expenses & Taxes

Return on Assets

Measures profit earned relative to total farm assets, including assets financed with debt and those financed with farm equity. Return on assets is equal to:

$$\frac{\text{Net Earnings + Interest Expense}}{\text{Average Assets}}$$

Return on Equity

Measures profit earned relative to a farmer's equity investment in the farm operation. Return on equity is equal to:

$$\frac{\text{Net Earnings}}{\text{Average Net Worth}}$$

Debt Capacity

The maximum amount of capital debt that can be repaid from a farm's cash flow, the calculation of debt capacity is described in the summary.

Reserve Debt Capacity

The amount of additional capital debt (beyond that already incurred) that a farm can service from cash flow. Reserve debt capacity represents a farm's buffer against financial adversity. It is equal to:

Debt Capacity – Capital Debt

Overhead Costs

Costs that do not vary with a change in production output, such as depreciation, interest, repairs, taxes and insurance, etc.

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