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## US Dairy Herds and Policy and the 2022 Census of Agriculture

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February 23, 2024

*farmdoc daily* (14): 38

Gardner Policy Series

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Recommended citation format: Zulauf, C. and G. Schnitkey. "US Dairy Herds and Policy and the 2022 Census of Agriculture." *farmdoc daily* (14): 38, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, February 23, 2024.

Permalink: <https://farmdocdaily.illinois.edu/2024/2/us-dairy-herds-and-policy-and-the-2022-census-of-agriculture.html>

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The exit of dairy operations since 2017 has attracted considerable attention (see, for example, MacDonald, Law, and Mosheim, July 2020). The 2022 *Census of Agriculture* confirms a profound decline, even within the context of the long-standing decline in dairy herds. The economic pressure for fewer dairy herds is abating but remains notable. An important question is, "What role did current dairy policy play in the post-2017 consolidation?"

### Dairy Farms

According to the 2022 *Census*, 24,094 US farms sold milk during 2022 (see Figure 1). The largest number of dairy farms with milk sales had 50-99 cows.

Another 11,942 farms had milk cows on December 31, 2022 but had not sold any milk during 2022. Of these farms, 97% had less than 10 cows.

### Milk Sales

In 2022, the 2,013 farms with 1,000 or more cows accounted for 66% of all US milk sales (see Figures 1 and 2). The comparable share was 57% in 2017.

In 2022, the US produced 226.4 billion pounds of milk, up from 215.5 billion pounds in 2017 or by 5% (US Department of Agriculture, National Agricultural Statistics Service).

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Figure 1. Number of Dairy Farms With Milk Sales by Number of Cows in the Herd, US, 2022 *Census of Agriculture*

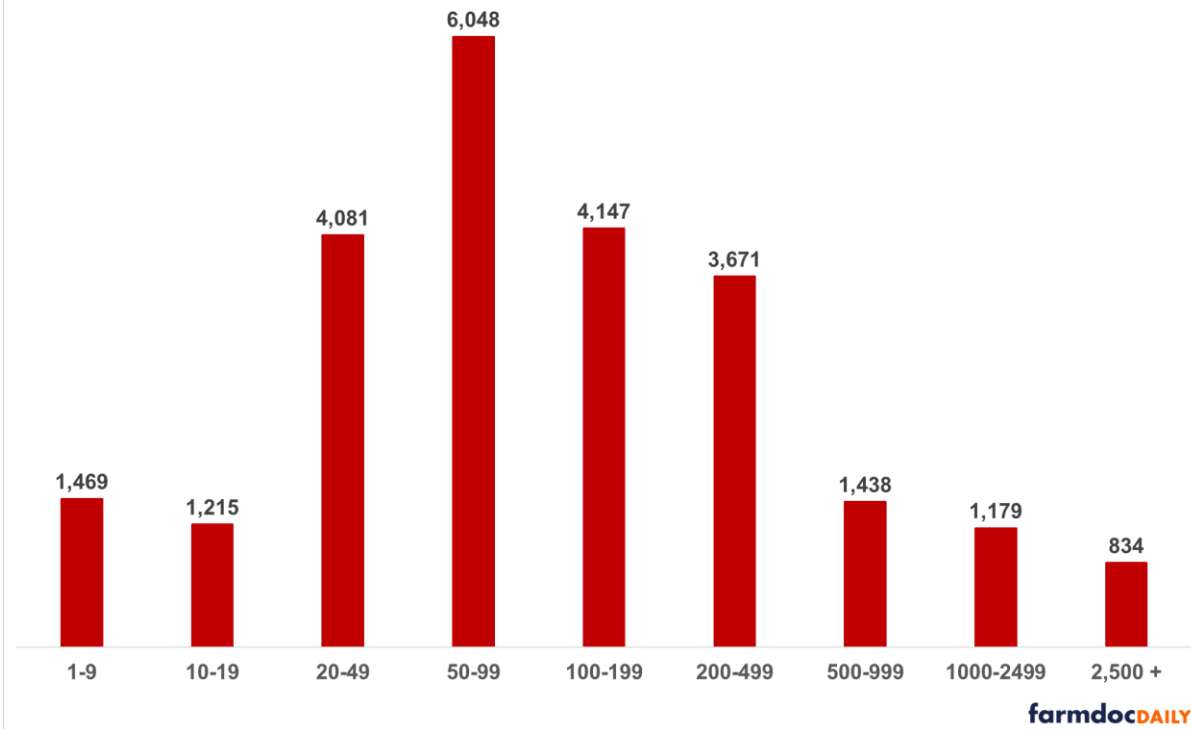
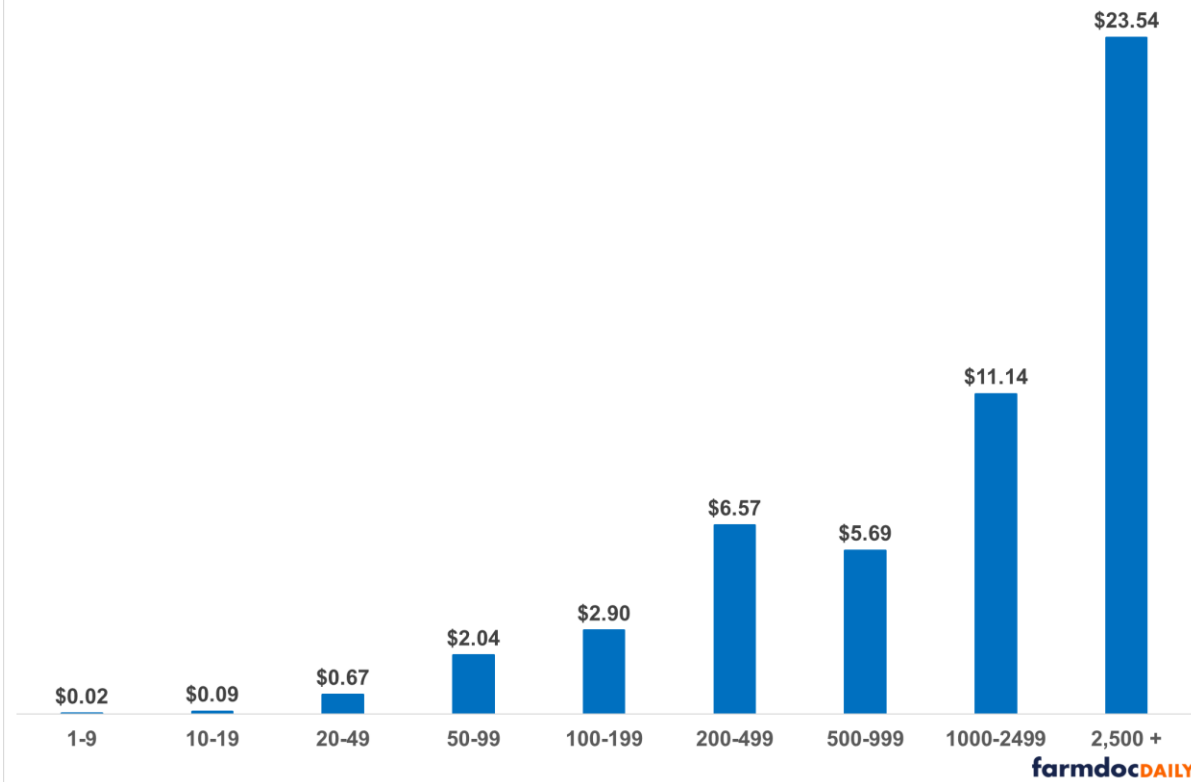
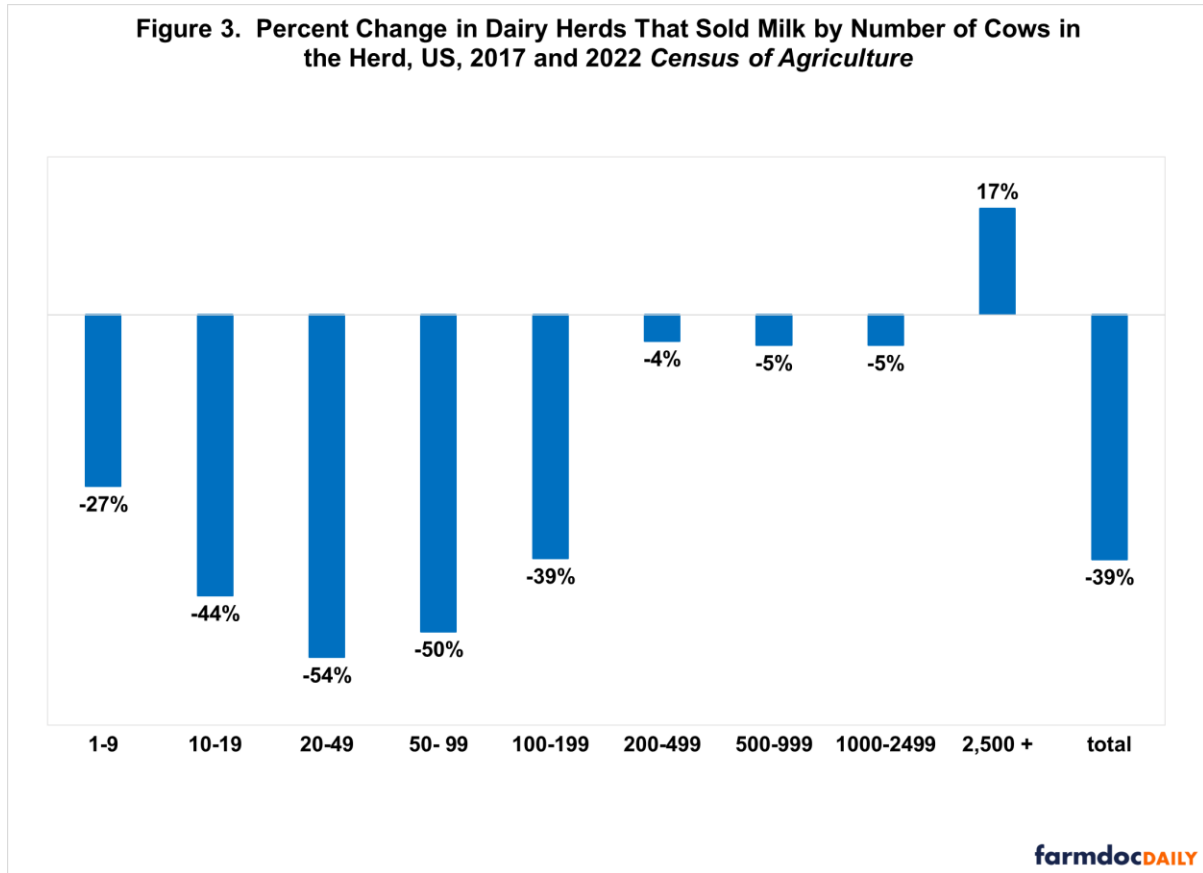


Figure 2. Milk Sales (Billion \$) by Number of Cows in the Herd, US, 2022 *Census of Agriculture*



### Dairy Farm Transition, 2017-2022

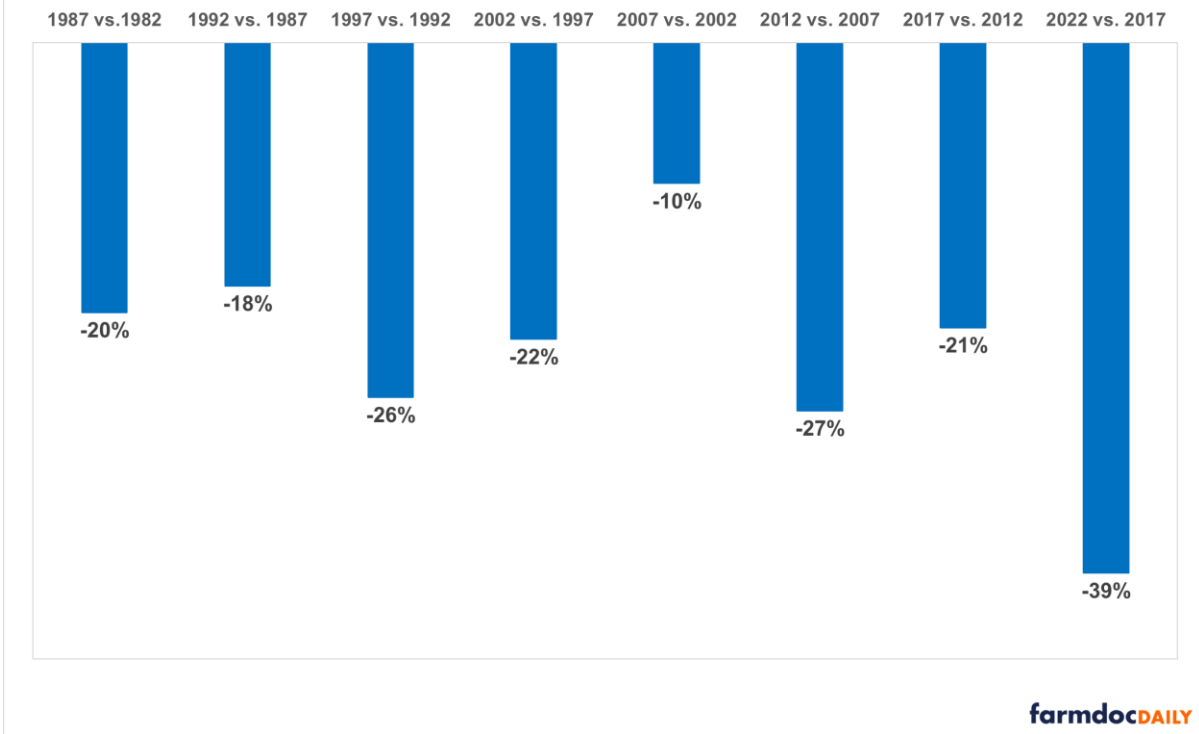
Fewer US farms sold milk in 2022 than 2017 at all herd sizes except those with 2,500 or more cows (see Figure 3). The latter increased from 714 to 834 farms. Herds of 20-49 cows declined the most on a percentage basis, followed by herds of 50-99 cows. In total, 39% fewer US farms sold milk in 2022 than 2017.



### Dairy Farm Transition, Historical Perspective

The -39% decline in all US farms that sold milk between the 2017 and 2022 *Census of Agriculture* was the largest decline between adjacent *Census* dating back to the 1982 *Census* (see Figure 4). The next largest declines were -27% between the 2007 and 2012 *Census* and -26% between the 1992 and 1997 *Census*. Large percentage declines in US dairy farms have been an on-going story, but the most recent decline stands out.

**Figure 4. Percent Change in Total US Dairy Farms That Sold Milk Between Adjacent US Census of Agriculture, 1982-2002**



A question that emerges from Figure 4 is, “What caused higher exits from dairy farming during 2017-2022?” One factor was huge losses occurring over an extended period of time. Since the decision to exit (and enter) dairy farming is a strategic investment decision, a 10-year sum was calculated of the net return above the economic cost of producing milk as computed by USDA, ERS (US Department of Agriculture, Economic Research Service). The 10-year sum starts with 1989 because 1980 was the first year USDA, ERS published the cost of producing milk. An economic cost includes a cost assigned to unpaid labor and farm-produced feeds.

The cumulative 10 year net return to economic cost has been below -\$10/cwt. since 1998. It was below -\$30/cwt. from 2009 through 2018 (see Figure 5). The largest 10-year losses were -\$37/cwt. in 2013 and -\$36/cwt. in 2015. Since 2015, 10-year losses have declined almost 50%, equaling -\$19/cwt. in 2022.

Additional perspective is gained when Figure 5 is combined with the large economies of size that exist in US milk production (see Figure 6). Economies of size are much greater for non-feed than feed cost. Over 2016-2022, highest and lowest cost differ by \$2.50/cwt. (\$12.87 - \$10.37) for feed but by \$19.59 for non-feed (\$27.96 - \$8.37). The large economies of size mean financial pressure from low returns to producing milk is much more acute for smaller herds, as the larger percent decline in smaller dairy herds between 2017 and 2022 illustrate (see Figure 3). An interesting feature of the economies of size relationship is that non-feed exceed feed cost for herds of less than 1000 cows while feed costs exceed non-feed cost for herds of 1000 or more cows and especially herds of 2000 or more cows. Figure 6 starts with 2016 because that is the first year that USDA, ERS reported costs separately for herds of 2000 or more cows.

Figure 5. 10-Year Sum of Net Return Above Economic Cost (\$ Per Cwt. (Hundredweight)), US Milk Production, All Herds, 1989-2022

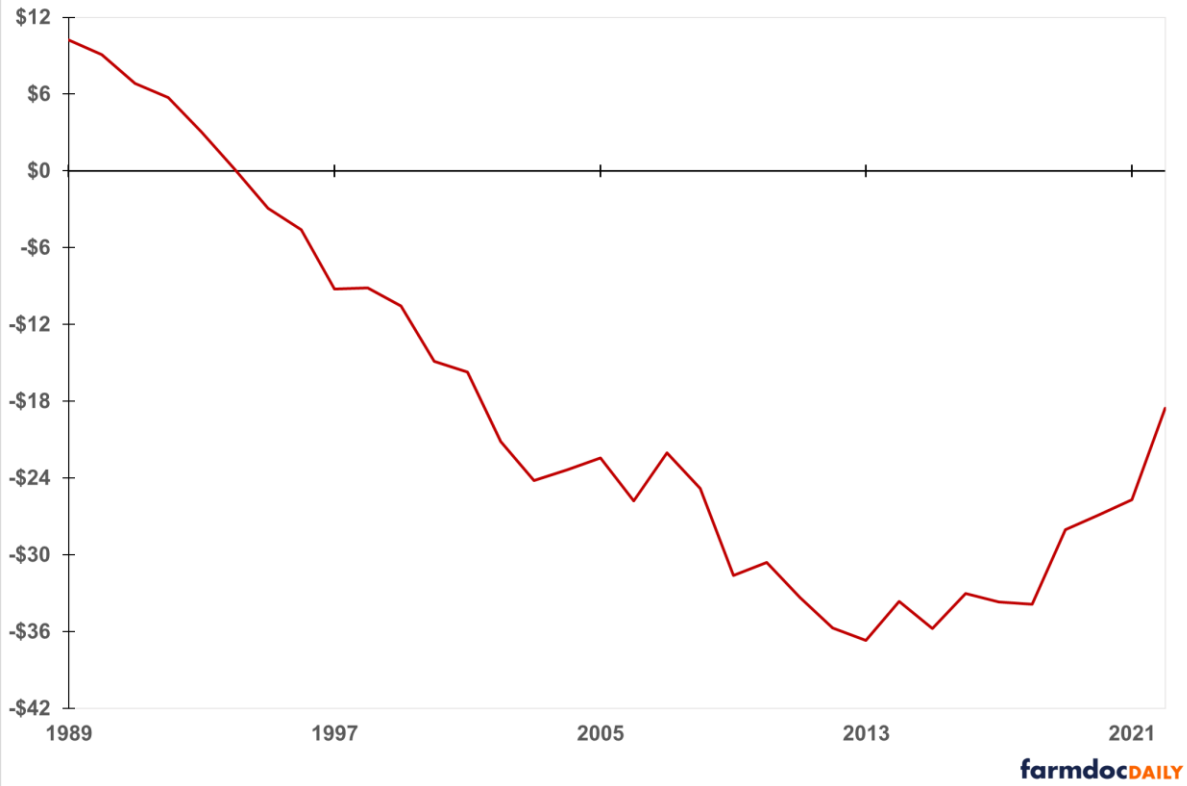
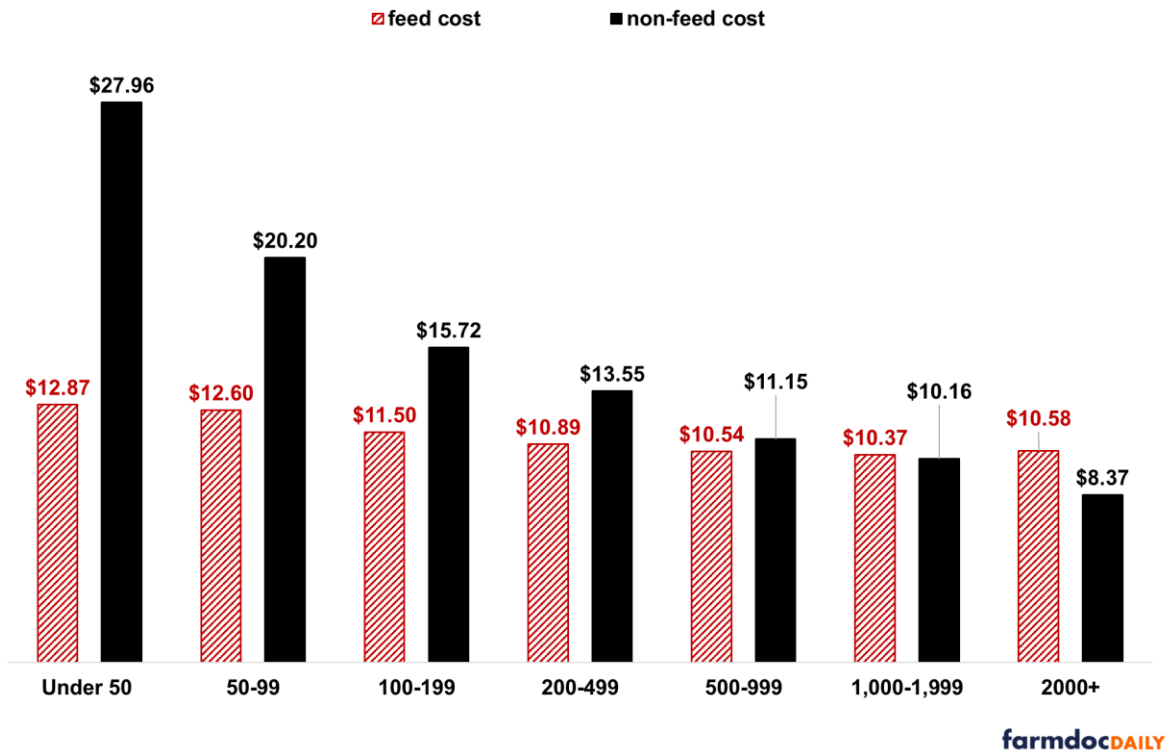
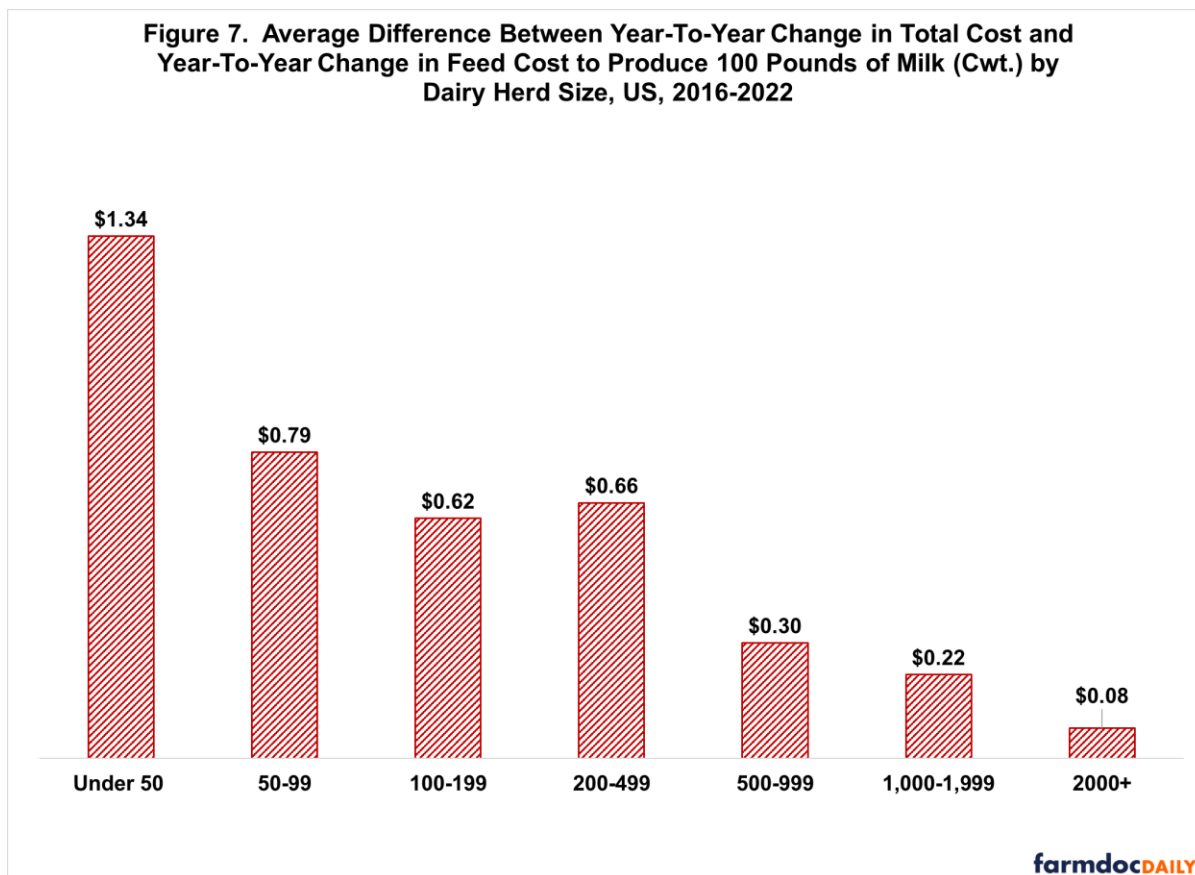


Figure 6. Average Feed and Non-feed Economic Cost of Producing 100 Pounds of Milk by Dairy Herd Size, US, 2016-2022



The large difference in the relative roles of feed and non-feed cost across herd size is consistent with the large difference in feed cost's role in year-to-year changes in total cost across herd size. The difference between year-to-year change in feed cost and total cost per cwt. has been minimal for herds of 2000 or more cows since 2015 (see Figure 7). In other words, on average feed cost accounted for most of the year-to-year change in total cost for these herds. As herd size declines, the difference between the average year-to-year change in feed and total cost becomes larger, implying that the year-to-year change in feed cost explains less of the year-to-year change in total cost. It is important to note that considerable variation exists across years in the relationship between year-to-year changes in feed cost and total cost for a given herd size.



The relationship between feed cost and total cost has policy significance. The 2014 farm bill authorized a Dairy Margin Protection Program that made payments when the margin difference between the US average all milk price received by farms and the cost of feeds (corn, soybean meal, and alfalfa) was below a specified value. The 2018 farm bill renamed the program, Dairy Margin Coverage (DMC). Many payment parameters and calculations used in the formula were modified, but the basic policy design was retained. For a brief but longer history of US dairy policy see the discussion in the *farmdoc daily* of [November 22, 2021](#).

## Discussion

Even relative to the notable historical decline in US dairy herds over the last 50 years, the decline between the 2017 and 2022 *Census of Agriculture* was large.

A likely important factor underpinning the sizable decline between 2017 and 2022 is US dairy sector financial stress that dates to the turn of the 21<sup>st</sup> Century. Dairy sector financial stress is likely abating but still remains notable.

Another likely important factor is the sizeable economies of size that exist in producing milk. They exacerbate sector financial stress for all but the largest dairy herds.

The sizeable economies of size are largely due to non-feed cost per cwt. of milk produced. Given the large difference in non-feed cost per cwt. across dairy herds, it is not surprising that changes in feed cost per cwt. have a much larger role in changes in total cost per cwt. for larger dairy farms.

The preceding point suggests a program that bases dairy policy payments on the milk price-feed cost margin, such as the current DMC program, is likely to provide the most protection against lower milk profitability for the largest dairy farms, although it is important to note that quantity of milk that can receive a DMC payment is capped.

If policy deliberations come to the conclusion that dairy policy should be more attentive to the financial stress on smaller dairy farms, policy options include the following:

1. Scale DMC payments by the ratio of non-feed costs to feed costs for a given size dairy herd. In essence, DMC payment per cwt. could be higher than 100% for smaller dairy herds.
2. Create a new payment program based on non-feed cost per cwt.
3. Make a per cow payment for a limited number of cows per dairy operation. Because implementing payment limits of any type is difficult since farms rearrange their operation to qualify for payments, a payment per cow could be made to all dairy farms up to the given number of cows. Smaller dairy farms would however receive the most benefit since a larger share of their cows would qualify for a payment.

All of these policy options could be implemented without changing current DMC payment calculations.

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