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The effect of seasonality on the financial performance of dairies in Florida: what do DBAP and DHIA data show?

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This article is the first in a series where we explore reasons behind the variation in financial performance of dairies in Florida. Our goal is to identify management strategies that the financially most successful dairies have in common. These analyses are part of the objectives of Dairy Business Analysis Project (DBAP).

In this article we show some preliminary results from a study where we have started looking at the relationship between financial performance and seasonality in milk production and calving pattern. Work by DeLorenzo, Kilmer, and Gao had earlier demonstrated that breeding and replacement decisions along with the accompanying seasonality might dramatically affect the profitability of the Florida dairy business throughout the year. We were also interested to see if reducing the seasonality in milk production per cow was more profitable.

We combined six years of financial data collected through DBAP (1996 – 2001) with data from the corresponding DHIA herd summary reports during the same years. Therefore, herds in the study had to be both on DBAP and DHIA at the same time for at least one year. The numbers of herds included were: 16 (1996), 22 (1997), 24 (1998), 10 (1999), 12 (2000), and 14 (2001). The total number of year-herd observations was therefore 98, but many herds contributed data in more than one year.

The seasonality in the average milk / cow / year (milk production) and the average number of calvings / average number of cows in the herd (calving pattern) for the six years is obvious in Figure 1.

Our measure of seasonality was calculated per dairy per year as the sum of the squared deviation of the averages of three multi-month periods with the annual average. The three multi-month periods were 1) January through May, 2) July through October, and 3) the remaining months. An example for one herd is shown in Figure 2.

We compared the seasonality in milk production per cow and calving pattern with the net farm income from operations / cwt (NFIFO /cwt). NFIFO is calculated as total revenue minus total cost and is one measure of profitability.

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Figure 3 shows that seasonality in milk production / cow or calving pattern was not very clearly related to NFIFO / cwt. Average seasonality in milk production / cow tended to have the lowest NFIFO / cwt, while average seasonality in calving pattern tended to have the highest NFIFO /cwt.

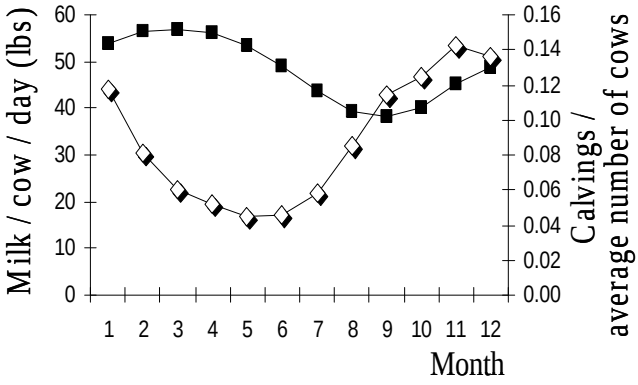

Figure 1. Average milk / cow / day (¦) and calvings / average number of cows (?). The seasonality is obvious. Source: DHIA data.

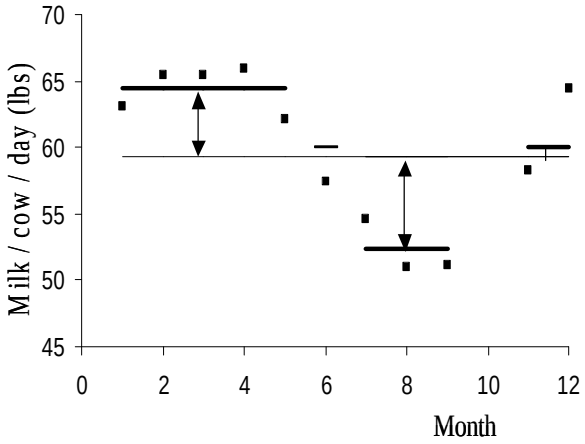

Figure 2. Seasonality is calculated as the sum of the deviations (squared) of the averages of three multi-month periods with the annual average. ¦ = average monthly milk yield in this example.

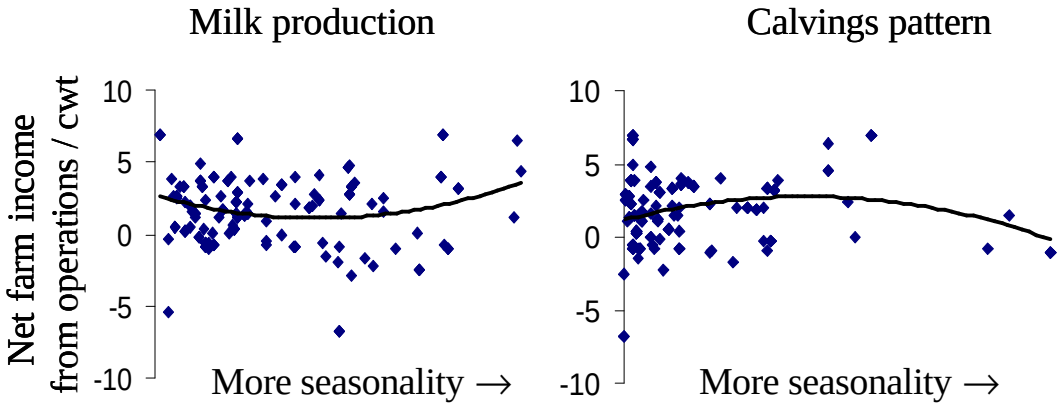

Figure 3. Distribution of net farm income from operations / cwt by seasonality in milk production (left) and seasonality in calving pattern (right). Both graphs show that the effect of seasonality on net farm income from operations / cwt, as measured by DBAP and DHIA data, is not very clear.

When the milk production data was split into two groups, one with the 50% lowest seasonality in milk production and one with the 50% highest seasonality in milk production, the NFIFO / cwt was $1.71 for the low seasonality group and $2.26 for the high seasonality group. A similar sort for calving pattern resulted in $1.86 for the low seasonality group and $1.60 for the high seasonality group.

So the results are not yet very clear. Does this mean that we can conclude that in general controlling seasonality in milk production or adapting to seasonality through a seasonal breeding strategy does not pay? Not really. These results are based on simple sorts of NFIFO / cwt by our measure of seasonality. This simple sorting approach has actually several problems.

The main problem is that NFIFO / cwt is driven by many other factors than our measure of seasonality, for example by cost control, milk per cow, management capacity, youngstock raising, bst use, etc. A simple sort assumes for example that the use of bst in both the low and high seasonality groups are similar. But (as a hypothetical example) if the high seasonality group would have most herds on bst and the low seasonality group would have few herds on bst, then the difference in NFIFO / cwt could be caused by the use of bst, or the seasonality, or both. We don't know the effect of seasonality, unless we adjust the effect of seasonality for the effect of bst and other factors that are not the same in both groups. We will later do this through a better statistical analysis.

Another problem with the results from this simple sort is that several herds are represented in every year and therefore are counted six times whereas other herds are represented only in one year and thus counted once. A better analysis can fix this problem too.

DeLorenzo, Kilmer, and Gao all used advanced calculations instead of looking at realized production and financial data to say something about the effects of seasonality on profitability in Florida herds. Their approach may be preferred in some cases. Nevertheless, combining DBAP data with DHIA data may unlock many interesting relationships, but it takes a little better analysis than a simple sort. To be continued.