FACTORS WHICH CONTRIBUTE TO THE FINANCIAL PERFORMANCE OF SELECTED TENNESSEE DAIRIES

Kimberly L. Haden and Larry A. Johnson

Abstract

The objective of this study was to identify factors which contributed to the financial performance of 81 selected dairy farms in Tennessee. The study analyzes several measures of financial performance including cash farm income, net farm income, and returns to operator labor and management. Regressions with ten explanatory variables were used to determine factors that explained the variation in the measures of financial performance. Production per cow, number of cows, price received for milk, forage costs, and level of debt use appeared to influence financial performance.

Key words: financial performance, dairy operation.

Consistent with the national trend of a declining number of dairy farms (U.S.D.A.), the number of dairy farms in Tennessee declined 44 percent between 1978 and 1985 (Tennessee Department of Agriculture). A pertinent issue, given this downward trend in dairy farm numbers, is what makes some dairy operators more successful than others. Matulich focused on the economies of scale associated with large scale dairy enterprises. Findings from Bratton's study, however, suggested that while using similar amounts of land, labor, and capital, farmers have sizable differences in incomes. These findings would perhaps imply that differences in incomes resulted from varying levels of managerial skills on the part of dairy operators, rather than simply differences in scale. Financial summaries of dairies enrolled in Tennessee's Resource Management program are consistent with Bratton's sample demonstrating a difference of $64,000 in the averages of net farm income between the upper and lower one-fourth in 1985 (Garland, 1986).

Several studies have also attempted to analyze various farm-level factors which contribute to financial success or lack of it (Kauffman and Tauer; Tauer and Belbase; Grisley and Mascarenhas; Lines and Morehart). Kauffman and Tauer analyzed 16 dairy farm characteristics using logit regression to determine which factors led to a greater probability of success on New York dairy farms. They categorized dairy operations into successful or nonsuccessful groups based upon the performance criteria of labor and management income per operator, labor and management income per operator per cow, rate of return on equity capital, and rate of return on equity capital excluding appreciation. Their study found that while production levels per unit were of primary importance, purchased feed per cow, hired labor per cow, and debt-to-assets were also important. Other variables such as the age of operator, diversification, and number of cows were insignificant.

Grisley and Mascarenhas and Tauer and Belbase performed efficiency studies focusing on operating cost efficiency of dairy farms. Both of these studies categorized operations as being efficient or inefficient and then regressed an efficiency based binomial dependent variable upon various factors including size of operation, age of operator, production per cow, debt per cow, etc. Grisley and Mascarenhas found factors such as production of milk per cow and hired labor to total labor costs had positive effects upon cost efficiency on Pennsylvania dairy farms. Tauer and Belbase found larger herds to have positive effects upon efficiency on New York dairy farms, while age, education, and DHIA recordkeeping had little effect. By using a cost efficiency frontier, these studies were able to

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employ the use of farm business records with limited production information. However, cost efficiency is only one facet of overall farm financial performance.

Other studies, such as Carley's and Dahlgran's, employed the neoclassical production function approach to estimate input elasticities. Such studies provide useful insights into efficiency of resourse use; however, they require a priori specification of the production function. Additionally, they require data on input quantities and their prices which are inseparable in many farm business records.

The purpose of this paper is to identify factors which contribute to financial performance on selected dairy farms in Tennessee. Variables representing farmer characteristics, farm organization, marketing efficiency, resource use efficiency, and financial exposure are used to explain financial performance of the dairy operation. While the financial performance approach does not fully express all functional relationships reflecting farm profitability, it is a rather pragmatic means of analyzing existing farm record information and has been used in numerous performance studies.

MEASURING FINANCIAL PERFORMANCE

Performance is a subjective term and depends in part upon the time frame considered. Therefore, the criteria by which a farm's performance is measured must be clearly defined. Cash farm income measures (CFI) reflect positive or negative cash income. The measure of cash farm income used in this study is total farm receipts less cash operating expenses, including interest payments. The yearly changes in CFI, however, may come from simple adjustments in inventory (Lins et al.). Thus, CFI may be a misleading indicator of farm profitability. Several studies have investigated the use of net farm income (NFI) as the performance measure (Melichar; Seger and Lins). The benefits of using an accrual measure of income, such as NFI, rather than CFI have been well-documented in past studies (Lins et al., Seger and Lins).

The accrual measure used in this study is made by adjusting cash income for changes in crop and livestock inventories. While this is not a complete accrual method, inventories may account for a large proportion of the difference between cash and accrual incomes.[1] For example, Seger and Lins found that changes in inventories explained about 93 percent of the differences between cash and accrual income for a sample of Illinois farm operators.

Positive values for both CFI and NFI are critical to the short-term survival of the farm. Most farmers must balance equity growth with the need to meet short-term cash commitments. The use of CFI or NFI as a sole performance measure, however, may present a problem because both are accounting measures which do not address opportunity costs. Hence, CFI and NFI as performance measures do not necessarily accurately reflect use of the resource base. For example, a less-established dairy farm may have large debts and low net farm income due to interest expense. The farmer, however, may be using debt and the resource base efficiently. Conversely, a more-established farmer may have paid off a large proportion of debt over time, which boosts net farm income, and yet may be making less efficient use of farm resources.

Returns to operator labor and management (ROLM) diminishes the "debt-effect" on financial performance which was described above in the hypothetical comparison between more-established and less-established dairy operators. Hence, ROLM allows concentration on factors affected by management decisions. ROLM is defined as net farm income adjusted for interest paid, less opportunity cost on total capital and the return to nonoperator labor. This measure may be deemed to be an appropriate indicator of operator performance over time, because the success of a farming operation ultimately falls upon the ability of the owner-operator to manage the resources. Decisions concerning the selection of farm enterprises, combinations of farm inputs, and financial exposure are ultimately reflected in ROLM. However, ROLM is not without disadvantages as an indicator of financial performance. Measures of the opportunity costs which are used in calculating ROLM, in particular the cost of unpaid family labor and the interest rate on owned capital, are subjective values. Additionally, ROLM may give little or no indication of the farm's cash flow problems.

Since the various aforementioned measures

[1]A complete accrual method would also account for changes in accounts receivable, changes in prepaid and accrued expenses, and changes in accounts payable (Seger and Lins). Such information was not available from the surveys.

of success of a farm each have distinct advantages and disadvantages, CFI, NFI, and ROLM are all employed as performance measures. While other return measures of financial success, including return on equity and/or assets, were considered, only income measures were employed. The purpose of the study was to determine differences in performance variables. Return measures would have required an opportunity cost for management adjustment, since few farmers earn salaries. In addition, by regressing each of the performance measures, which range from a cash measure to a measure of resource use, on the set of variables hypothesized to affect farm financial performance, those variables which are critical to financial performance regardless of debt load or the ability to meet short-term cash commitments can be identified. Therefore, differences in the effects of the explanatory variables upon the three performance measures may provide some useful insights into the variables which are critical depending upon whether the emphasis is upon a cash flow measure or a resource use measure.

The remainder of this paper is presented as follows. The data set is first described. The methodology and model specifications are then presented. Finally, the results from the model are presented with some concluding remarks regarding their possible implications.

DATA DESCRIPTION

Data were obtained from the *Farm Business Survey* completed under the Tennessee Resource Management Program, or RMP (Univ. of Tennessee). The overall purpose of the program is to demonstrate to Tennessee farmers that net farm income can be increased by making appropriate resource use adjustments (Garland, 1980). Hence, farmers were selected if their farms offered opportunities for demonstrating solutions to major resource problems. Program participants were selected from the 56 counties falling within the Tennessee Valley area, located primarily in the eastern, plateau, and middle regions of Tennessee, and could be enrolled for a maximum of six years. Data employed in this study included only those farms which were selected as viable full-time dairy enterprises and participated in both program years 1985 and 1986. Records were analyzed for 81 dairy farms.

While the criteria by which the dairy operations were chosen to participate in the program were somewhat selective, and therefore the sample was not a random one, these dairy operations shared similar characteristics to dairy operations within the area. For example, the sizes of operations range between 28 and 240 cows per herd. Whipple, using a sample of Grade A dairy operations within Tennessee, found the average herd size to be 86 cows in 1983. Additionally, Whipple found that 91 percent of Tennessee Grade A herds had between 20 and 200 cows. In both samples, the ratio of milk sales to total sales was fairly high. Whipple found that more than 90% of all dairy operations had a ratio of milk sales to total sales of 70% or greater. Similarly, the sample of RMP participants had an average ratio of milk sales to total sales of 88% with a minimum of 60% and a maximum of 97%. Other characteristics such as production of milk per cow, indebtedness, percent growing silage, and percent growing tobacco also appeared to be similar between the two samples. Average milk sold per cow for the sample of RMP participants was 12,184 pounds. The average debt-to-asset for the sample was .46. About 95% grew silage, while 41% grew tobacco.

A primary difference between the two samples was that the average age of the RMP participants was lower than the average age from Whipple's sample.[2] Although the data set has the disadvantage that it may not represent all Grade A dairy farmers in Tennessee, it does have the advantage that it represents a group of operators facing somewhat homogeneous conditions.

The values for the data were averaged over the period 1985 and 1986 to provide more than one year of farm performance records, perhaps helping to mitigate the problem of a single year's unusual performance dominating the analysis. The complete span of participation in the program, six years for each dairy operator, was not used. This would have drastically reduced the available set of farm records for consecutive years because of the number of participants entering and leaving the program each year.

[2]The average age of farmers in the RMP program was 36.7, while the average in Whipple's sample was 49.

METHODOLOGY AND MODEL SPECIFICATION

The dependent variables CFI, NFI, and ROLM were regressed upon factors hypothesized to affect the farm's financial performance. Ordinary least squares was used, since no evidence of heteroscedasticity was found. Also, collinearity diagnostics performed on the explanatory variables showed no evidence of degrading collinearity.

Ten variables were hypothesized to represent factors affecting the performance of the dairy farm (see Table 1). The hypothesized factors may be classified into several categories: farmer characteristics, farm organization measures, measures of marketing efficiency, measures of resource use efficiency, and indicators of financial exposure. Weston and Brigham define several major categories for financial ratio analysis including profitability, liquidity, leverage, and activity (efficiency of resource use). Kauffman and Tauer divided their explanatory variables into categories of production variables, marketing variables, and financial variables. Tauer and Belbase cite the efficiency of the firm as including technical efficiency, allocative (price) efficiency, and scale (size) efficiency. The categorization employed in this study is somewhat analogous to the aforementioned methods. Farmer characteristics may give some insight as to the training and experience of the dairy operator, hence managerial resources. The farm organization category should include information which represents how the operation is organized, including size and diversification. Marketing efficiency reflects allocative efficiency on the output side. Resource use efficiency indicates how well inputs are used and therefore encompasses technical efficiency.

For example, farm organization differences were identified by variables such as herd size and milk sales relative to total farm sales. Marketing efficiency could be influenced by factors such as the quality of milk, milk fat, and/or average blend price and would be reflected in the average price of milk. Resource use efficiency was identified by production of milk per cow, forage production costs per cow, labor costs per cow, buildings and equipment investment per cow, and feed purchased per cow. The debt-to-asset ratio was selected to identify the overall financial exposure of the farm (Weston and Brigham). Age was also included to give some insight as to the influence of farmer demographic characteristics upon farm performance.

TABLE 1. VARIABLES USED IN THE REGRESSIONS

Variable	Units	Definition	Hypothesized Direction		
			CFI	NFI	ROLM
		Farmer Characteristics			
AGE	(Years)	Average age of operator(s)	?	?	?
		Farm Organization			
RMSTS	(ratio)	Milk sales as a proportion of total farm sales	?	?	?
CW	(Head)	Number of milk cows	?	?	?
		Marketing Efficiency			
MILKP	($/cwt)	Price received per hundredweight of milk sold	+	+	+
		Resource Use Efficiency			
PPCW	(lbs/cow)	Milk sold divided by the number of dairy cows	+	+	+
FCCW	($/cow)	Forage production costs divided by the number of dairy cows	–	–	–
FPCW	($/cow)	Feed purchased divided by the number of dairy cows	–	–	–
LCCW	($/cow)	Labor costs divided by the number of dairy cows	–	–	–
BEQCW	($/cow)	Buildings and equipment divided by the number of dairy cows	–	–	–
		Financial Exposure			
DA	(ratio)	Total farm debts divided by total farm assets	–	–	?
		Performance Measure			
CFI	($)	Cash farm income	LHS[a]	LHS	LHS
NFI	($)	Net farm income	LHS	LHS	LHS
ROLM	($)	Returns to operator labor and management	LHS	LHS	LHS

[a]LHS—left hand side.

TABLE 2. REGRESSION MODELS FOR 81 SELECTED TENNESSEE DAIRY FARMERS[a,b]

Explanatory Variable	Regression Coefficient for the Dependent Variable: CFI	NFI	ROLM
INTERCEPT	−32699.2867	−106549.776	−86861.3608
	(−.2518)	(−2.076) **	(−1.803) *
AGE	101.0582	−476.501	−482.1865
	(.659)	(−1.714) *	(−1.848) *
MILKP	5287.1703	9937.795	8037.2406
	(2.698) **	(2.795) ***	(2.409) **
CW	497.6862	−143.919	−832.6683
	(3.391) ***	(.541)	(3.333) ***
CWSQ	−.95351	2.558521	4.333427
	(−1.655)	(2.449) **	(4.419) ***
PPCW	5.554435	6.197363	6.727049
	(2.698) ***	(3.473) ***	(4.017) ***
RMSTS	−91519.2444	41892.928	−17615.6028
	(−3.728) ***	(−.941)	(−.421)
FCCW	−89.1616	−72.0727	−96.1520
	(−5.347) ***	(−2.383) **	(−3.387) ***
FPCW	−5.69836	−8.88795	−13.9903
	(−.522)	(−.449)	(−.752)
LCCW	−12.9034	−5.93256	−15.6395
	(−.619)	(−.157)	(−.441)
BEQCW	−4.93349	1.066647	−7.27358
	(−2.022) **	(.291)	(−2.112) **
DA	−9150.5678	−13246.985	11284.1393
	(−2.319) **	(−1.876) *	(1.680) *
R-squared =	.6041	.5517	.5337
DFE =	69	69	69

[a] Values in the parentheses are calculated t-statistics.

[b] *** denotes statistical significance at .01 level, ** denotes statistical significance at the .05 level, * denotes statistical significance at .10 level.

Education levels would have provided additional useful demographic information; however, this information was not available.

As may also be seen in Table 1, age was hypothesized to be of indeterminant influence upon performance. While older dairy operators may have more practical experience than younger operators, they may be more resistant to adopting innovative management practices (Carley and Fletcher). Milk price and milk sold per head were hypothesized to have a positive influence upon performance.

As evidenced by the review of related studies, the effect of the number of dairy cows upon financial performance could not be predicted. While Matulich found economies of scale in dairying, Kaufmann and Tauer's findings indicated no strong relationship between the number of cows and the probability of success. Hence, economies of size may not necessarily exist under the conditions of production which occur in Tennessee. Since no clear sign could be postulated for the effect of the number of dairy cows, and various studies have found conflicting results, alternative functional forms for the number of dairy cows were tested. These tests suggested that a quadratic specification, rather than a linear specification, for the number of dairy cows might be appropriate for use in the equations with ROLM and NFI as the dependent variables.

Because the contribution of other crops to margin was not known a priori, no obvious relationship between the ratio of milk sales to total sales and performance could be postulated. For example, many Tennessee dairy farmers grow some tobacco which may or may not make a positive contribution to net margin. Tobacco can provide an important source of year-end cash flow. However, growing tobacco forces labor from the forage-making portion of the dairy operation during time of peak labor utilization.

All the expense variables were hypothesized to have a negative influence upon financial performance. The influence of the debt-to-asset ratio upon ROLM was indeterminant because changes in returns could depend upon whether borrowed funds were being used effi-

ciently. However, the debt-to-asset ratio was hypothesized to have a negative influence upon net farm income and cash farm income. Lins et al. found the effects of debt-to-assets upon financial performance decreased in significance as the performance measure was converted from a cash-to-accrual basis.

RESULTS

The results of the models are presented in Table 2. The hypothesized variables explained the greatest amount of variation in cash farm income and the least variation in ROLM. Of those variables for which sign could be postulated, most of the signs were in agreement with their hypothesized direction.

The number of dairy cows, production per cow, price of milk, and forage cost per cow were consistently important in all equations. The sign on the number of dairy cows was positive in all cases, possibly indicating economies of size over the range of values analyzed. The significance of the squared terms in the ROLM and NFI equations even more strongly suggests this hypothesis.

The sign on production per cow was also positive in every equation. The importance of production per cow in contributing to financial performance could demonstrate the benefits of using more advanced herd management practices which are cost-effective. In each equation, the price of milk had a positive sign, as was expected. The importance of the price of milk could reflect differences in milk fat or average blend price. The expenditure variables, labor costs per cow, feed purchased per cow, and forage production costs per cow all carried negative signs; however, only forage production costs per cow was significant in any of the equations. The importance of forage costs per cow versus feed purchased per cow is perhaps a result of the fact that most dairy operators in Tennessee rely heavily on forages grown on the farm (Whipple). The insignificance of the purchased feed variable may suggest that higher feed concentrate intake results in higher milk production levels thus mitigating the negative cost effect.

In addition to the important consistent behavior of some explanatory variables across performance measures, notable changes are observed in others. The coefficient on the debt-to-asset ratio changed from negative in the CFI and NFI equations to positive in the ROLM equation. The coefficient was significantly different from zero at the 5% level for CFI, but insignificant at the 5% level for the NFI and ROLM equations. The debt-asset coefficient in the ROLM equation, however, was significant at the 10% level. The negative coefficient for the debt-asset ratio in the CFI equation could indicate problems created by high debt loads which may be experienced by some dairy operators and demonstrates how critical debt load is to the short-term survival of the farm. The change to a positive, relatively significant debt-asset ratio coefficient for ROLM suggests that interest expense may not be a problem to some producers when compared to the opportunity cost of owned capital. Decisions concerning owned versus borrowed capital, of course, would vary relative to the cost of borrowed monies and producers risk preferences for meeting short-term debt commitments (Collins).

Age had a significantly negative influence upon both ROLM and NFI at the 10% level. The sign on age was positive in the CFI equation but was not statistically significant. These results point toward the possibility that as the measure of performance is moved away from a cash measure, as with CFI, to a measure of resource use, as with ROLM, age holds an increasingly negative influence. One interpretation of this result is that older operators may be in a better cash position due to a possibly lower debt load; however, they may not be the most efficient users of their resources.

The ratio of milk sales to total sales appeared to have a significant negative influence upon cash farm income with no significant influence upon NFI or ROLM. One possible implication of this result is that diversification of the dairy operation does not strongly affect efficiency of use of management's resources; however, it may help ease some cash flow problems. Another interpretation is that some producers are liquidating inventories or culling heavier to meet current cash needs, thus decreasing RMSTS. These decreases in RMSTS would perhaps be more likely to have some influence upon CFI, which is not adjusted for inventories, than on NFI or ROLM which are.

CONCLUSIONS

Several implications arise from this analysis. For dairies with characteristics similar to those in this study, the results tend to suggest that the primary contributors to success include increasing milk production levels per head, receiving a higher average

milk price, milking a larger number of dairy cows, and controlling forage feed costs per cow. Since increases in production per head positively affected financial performance and findings from past studies, such as Carley and Fletcher's, have shown a linkage between use of more advanced herd management practices and higher production per head, these increases may occur as a result of using cost-effective herd management practices. The importance of milk price in the equations could indicate that butterfat, blend prices, and/or quality of milk should be closely monitored.

While Kauffman and Tauer found little or no relationship between financial performance and the number of cows milked, there appeared to be a strong one here. One possible implication is that economies of size still exist for many dairy operators within Tennessee, even given the production conditions which exist within the area.

By using various measures of financial performance, some possible effects on cash income versus a return to management's resources could be seen. The varying effects of the ratio of milk sales to total sales upon the performance measures tended to suggest that while diversification of the dairy operation had little effect on efficiency of resource use, it did have a positive influence upon cash flows. One important implication of this finding relates to tobacco, which was widely grown by dairy operators in the sample and is grown by many Tennessee dairy operators. It has been a concern that, while growing tobacco is an important source of year-end cash flow for many Tennessee dairy operators, it might in fact reduce the efficiency of resource use because some of the most intensive labor usage periods for tobacco coincide with those in making forages. The results, however, did not suggest that diversification, which primarily came from growing tobacco for the sample used in this study, leads to significantly lowered returns to operator labor and management.

As the dependent variable was moved away from a cash or profitability measure to a resource use measure, the effect of debt load diminished. However, the negative effects of age became somewhat more pronounced. These findings may reflect a dairy industry where there are some young, less-established dairy operators who are carrying heavy debt loads but are receiving fairly good returns to their operator labor and management. Conversely, there may be some more-established dairy operators who are currently making less efficient use of their resources but who have most of their debts paid off and face few cash-flow problems. While these findings do point toward how the debt-to-asset ratio may influence returns, as stated previously, the optimal debt load to be carried by the operator would depend upon individual risk preferences (Collins).

While the authors do not wish to diminish the importance of cash flow upon the survivability of the dairy operation, this study tends to point toward the importance of efficiency of use of debt as a resource. One of the implications is that the younger dairymen are using borrowed money for investments in newer technologies, resulting in returns higher than their cost of capital. In the long run, these dairy operators may be successful, provided they can meet their short-term cash commitments.

REFERENCES

Bratton, C.A. "Dairy Management and New York Farm Incomes." A.E. Research 84-6, Dept. of Agr. Econ., Cornell Univ., 1982.

Carley, D. "Silage-Concentrate Substitution: Effects on Milk Production and Income Over Feed Cost in DHIA Herds." *Amer. J. Agr. Econ.*, 55(1973):641-46.

Carley, D., and S. Fletcher. "An Evaluation of Management Practices Used by Southern Dairy Farmers." *J. Dairy Sci.*, 69 (1986):2458-64.

Collins, Robert A. "Expected Utility, Debt-Equity Structure, and Risk Balancing." *Amer. J. Agr. Econ.*, 67(1985):627-29.

Dahlgran, R. "A Synthesis of Microeconomic Duality Theory and Distributed Lag Modeling With Implications for U.S. Dairy Policy." *No. Cent. J. Agr. Econ.*, 7(1985):132-44.

Garland, C. "Guideline for Recordkeeping." A.E. and R.D. Publication 38, Agr. Ext. Service, Univ. of Tennessee, 1986.

Garland, C. "Tennessee's Resource Management Program." Publication 840, Agr. Ext. Service, Univ. of Tennessee, April 1980.

Grisley, W., and J. Mascarenhas. "Operating Cost Efficiency on Pennsylvania Dairy Farms." *No. East. J. Agr. and Res. Econ.*, 14(1985):88–95.

Kauffman J., and L. Tauer, "Successful Dairy Farm Management Strategies Identified by Stochastic Dominance Analysis of Farm Records." *No. East. J. Agr. and Res. Econ.*, 15(1986):168–77.

Lines, A., and M. Morehart. "Financial Health of U.S. Farm Business in 1984: A Region, Type, and Size Analysis." *Agr. Finance Rev.*, 47(1987):43–52.

Lins, D., P. Ellinger, and D. Lattz. "Measurement of Financial Stress in Agriculture." *Agr. Finance Rev.*, 47(1987):53–61.

Matulich, S. "Efficiencies in Large Scale Dairying: Incentives for Future Structural Change." *Amer. J. Agr. Econ.*, 60 (1978):642–47.

Melichar, E. "Capital Gains Versus Current Income in the Farming Sector." *Amer. J. Agr. Econ.*, 60(1979):1085–92.

Seger, D.J., and D.A. Lins. "Cash Versus Accrual Measures of Farm Income." *No. Cent. J. Agr. Econ.*, 8(1986):219–26.

Tauer, L., and K. Belbase. "Technical Efficiency of New York Dairy Farms." *No. East. J. Agr. and Res. Econ.*, 16(1985):10–16.

Tennessee Department of Agriculture. *Tennessee Dairy Statistics: Annual Dairy Summary*, 1985.

U.S. Department of Agriculture, ERS. *Dairy Situation and Outlook Report.* U.S. Government Printing Office, Washington, D.C., various issues.

Univ. of Tennessee Agr. Ext. Service and Tennessee Valley Authority. *Farm Business Survey.* TVA Resource Management Program, 1983–1986.

Weston, F.J., and E.F. Brigham. *Managerial Economics.* 6th ed. Hinsdale, Ill.: Dryden Press, 1978.

Whipple, G. "Grade A Milk Production in Tennessee." Exp. Sta. Bull. No. 632, Univ. of Tennessee, 1986.