PERSISTENCE IN FINANCIAL PERFORMANCE

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Abstract

The purpose of this paper was to examine the persistence of financial efficiency and performance measures for a sample of farms. The profit margin ratio, the asset turnover ratio, and three expense ratios were computed for each farm and year, and for the four-year period. The number of years each farm was in the top and bottom performance quartile was also computed.
Results indicated that it was relatively difficult for a farm to consistently be in the top quartile over time. However, using four-year average data, there was a substantial difference in financial performance between farms in the top and bottom quartiles. Results suggest that using one year of data to benchmark is problematic. However, benchmarking using data for a longer period of time is essential to determining a farm's competitive position.

Key Words: Profit Margin, Asset Turnover, Expense Ratio

Introduction

In production agriculture, farms are diverse in terms of the inputs utilized and outputs produced. Moreover, it is a widely established fact that profitability, efficiency, and per-unit costs vary significantly among farms and ranches (Babcock; Fox, Bergen, and Dickson; Morgan and Langemeier). Are these differences in performance due to random events such as weather or are these differences due to controllable factors such as managerial ability?

The answer to the above question has a direct bearing on benchmarking and the search for a competitive advantage. If performance differences are primarily due to weather, benchmarking is not near as relevant to firms as it would be if performance differences are due to managerial ability or some other resource advantage. An examination of performance differences among farms for different lengths of time (e.g., one-year average, two-year average, three-year average, or four-year average) can help determine the importance of benchmarking.

The purpose of this paper was to examine the persistence of financial performance measures for a sample of farms over a four-year period. Financial performance was measured using the profit margin ratio, the asset turnover ratio, and expense ratios.

Methods

The profit margin ratio, the asset turnover ratio, the total expense ratio, the adjusted total expense ratio, and the economic total expense ratio were used to measure financial efficiency and performance for each farm and year using a sample of Kansas farms. The profit margin ratio represents a commonly used profitability measure. The asset turnover ratio and expense ratios are used extensively to measure financial efficiency or cost control.

The profit margin ratio was computed by adding accrual interest expense and subtracting unpaid family and operator labor from net farm income and dividing by value of farm production. The asset turnover ratio was computed by dividing value of farm production by total assets. The total expense ratio was computed by adding cash costs, accrual adjustments to costs, and depreciation and dividing by value of farm production. The adjusted total expense ratio was computed by adding unpaid family and operator labor to the total expense included in the total expense ratio and dividing by value of farm production. An adjusted total expense ratio below 1.00 indicates that a farm was able to cover accrual expenses, depreciation, and unpaid family and operator labor. The economic total expense ratio was computed by adding the opportunity cost of owned assets to the expenses used in the adjusted total expense ratio and dividing by value of farm production. If the economic total expense ratio is below 1.00 the farm is covering all accrual and opportunity expenses, and is earning an economic profit.

The number of years each farm was in the top or bottom quartile for each financial efficiency or performance measure was computed. Financial performance was also compared across quartiles for each financial efficiency and performance measure.

Data

Data for 1,255 farms in the Kansas Farm Management Association (KFMA) with continuous data from 2002 to 2005 were used in this study. These 1,255 farms represent approximately 82% of the farms with whole-farm analysis data in 2005. To be included in this study, a farm had to have a usable income, expense, and balance sheet data. Income and expense were expressed on an accrual basis. Value of farm production included crop income, livestock income, income from government payments and crop insurance proceeds, and miscellaneous income sources such as patronage dividends and custom work income. Livestock income was expressed on a value-added basis. Specifically, accrual livestock purchases were subtracted from accrual livestock sales to arrive at accrual livestock income.

Table 1 presents the summary statistics for the 1,255 farms. Value of farm production averaged $250,418. The average profit margin was 0.0962 or 9.62% while the average asset turnover ratio was 0.3000. The average total expense ratio, adjusted total expense ratio, and economic total expense ratio were 0.796, 0.964, and 1.147, respectively. As indicated by the percent of farms with an adjusted total expense ratio below 1.00, approximately 48% of the farms covered accrual expenses, depreciation, and unpaid family and operator labor. Only 13% of the farms covered all accrual and opportunity costs. A farm was considered to be financially stressed if it had an adjusted total expense ratio below 1.00 and had a debt to asset ratio above 0.70. Approximately 10% of the farms were financially stressed.

Table 1: Summary Statistics for 1,255 KFMA Farms with Continuous Data from 2002-2005.

Item	Average
Value of Farm Production (VFP)	$250,418
Net Farm Income	$51,100
Interest	$15,187
Unpaid Family and Operator Labor	$42,209
Total Assets	$834,818
Total Debt	$263,680
Total Expense Ratio (TER)	0.796
Adjusted Total Expense Ratio (ATER)	0.964
Economic Total Expense Ratio (ETER)	1.147
Operating Profit Margin Ratio	0.0962
Asset Turnover Ratio	0.3000
Debt to Asset Ratio	0.3159
Percent of Farms with Positive Net Cash Flow	92.51%
Percent of Farms Financially Stressed	9.72%
Percent of Farms with TER less than 1.000	88.92%
Percent of Farms with ATER less than 1.000	48.37%
Percent of Farms with ETER less than 1.000	13.23%
Percent of Farms with VFP less than $100,000	21.91%
Percent of Farms with VFP between $100,000 and $250,000	42.07%
Percent of Farms with VFP between $250,000 and $500,000	26.14%
Percent of Farms with VFP greater than $500,000	9.88%

Source: Kansas Farm Management Association 2005 Databank.

Profit Margin and Asset Turnover Ratio Results

Table 2 presents the number of farms and percent of farms by profit margin and asset turnover categories. Farms in the first category were in the top or bottom quartile for all four years. Only 48 farms or 3.82% of the farms were in the top profit margin quartile for all four years. Approximately 15% of the farms were in the top asset turnover ratio quartile for all four years. The fact that it was relatively easier to be the top asset turnover ratio category than it was to be in the top profit margin quartile is intuitively plausible. The components of the profit margin ratio, particularly net farm income, tend to be more variable than the components of the asset turnover ratio. It is important to note that approximately 51% and 62% of the farms were never in the bottom profit margin and bottom asset turnover ratio quartiles, respectively.

Tables 3-4 present the summary statistics for operating profit margin quartiles and asset turnover ratio quartiles. These tables were creating using four-year average data for each farm. The farms in top profit margin quartile had an average profit margin ratio of 0.2187 or 21.87%. In contrast, the farms in the bottom profit margin quartile had an average profit margin ratio of -0.2132. The farms in the bottom profit margin quartile also had a relatively low asset turnover ratio and relatively high expense ratios. In fact, none of the farms in the bottom profit margin quartile had an adjusted total expense ratio or an economic total ratio below 1.00 and only 62% of the farms covered cash expenses, accrual adjustments, and depreciation. The farms in the top asset turnover ratio quartile had an average asset turnover ratio of 0.6075 while the farms in the bottom asset turnover ratio quartile had an average asset turnover ratio of only 0.1341. The farms in top profit margin and asset turnover quartiles tended to be larger than the farms in the bottom quartiles.

The results in Tables 2-4 suggest that weather and other external factors made it difficult for a farm to consistently be in the top profit margin and asset turnover ratio quartiles over time. However, using the four-year average data, there was substantial difference in financial performance between farms in the top and bottom quartiles.

Expense Ratio Results

Table 5 presents the number of farms and percent of farms by expense ratio category. Farms in the first category were in the top or bottom quartile for all four years.

Table 2: Number of Farms and Percent of Farms by Profit Margin and Asset Turnover Categories.[a]

Item	Number of Farms	Percent of Farms
Top Profit Margin Category		
First Category	48	3.82%
Second Category	109	8.69%
Third Category	214	17.05%
Fourth Category	305	24.30%
Fifth Category	579	46.14%
Bottom Profit Margin Category		
First Category	98	7.81%
Second Category	92	7.33%
Third Category	164	13.07%
Fourth Category	260	20.72%
Fifth Category	641	51.08%
Top Asset Turnover Category		
First Category	189	15.06%
Second Category	82	6.53%
Third Category	73	5.82%
Fourth Category	104	8.29%
Fifth Category	807	64.30%
Bottom Asset Turnover Category		
First Category	184	14.66%
Second Category	74	5.90%
Third Category	83	6.61%
Fourth Category	132	10.52%
Fifth Category	782	62.31%

[a] Farms in the first category were in the top or bottom quartile for all four years. Farms in the second category were in the top or bottom quartile for three of the four years. Farms in the third category were in the top or bottom quartile for two of the four years. Farms in the fourth category were in the top or bottom category for one of the four years. Farms in the fifth category were not in the top or bottom category during the four year period.

Table 3: Summary Statistics for Operating Profit Margin Quartiles.[a]

	Profit Margin Quartile			
Item	First	Second	Third	Fourth
Value of Farm Production (VFP)	$101,069	$221,951	$285,611	$393,497
Net Farm Income	$1,572	$26,324	$56,245	$120,482
Interest	$6,992	$13,757	$16,932	$23,092
Unpaid Family and Operator Labor	$30,113	$37,257	$44,016	$57,497
Total Assets	$510,667	$712,072	$838,516	$1,279,433
Total Debt	$120,636	$231,693	$285,141	$417,742
Total Expense Ratio (TER)	0.984	0.881	0.803	0.694
Adjusted Total Expense Ratio (ATER)	1.282	1.049	0.957	0.840
Economic Total Expense Ratio (ETER)	1.591	1.222	1.112	1.015
Operating Profit Margin Ratio	-0.2132	0.0127	0.1021	0.2187
Asset Turnover Ratio	0.1979	0.3117	0.3406	0.3076
Debt to Asset Ratio	0.2362	0.3254	0.3401	0.3265
Percent of Farms with Positive Net Cash Flow	78.67%	94.90%	98.41%	98.08%
Percent of Farms Financially Stressed	11.15%	18.47%	7.32%	1.92%
Percent of Farms with TER less than 1.000	62.10%	93.95%	99.68%	100.00%
Percent of Farms with ATER less than 1.000	0.00%	19.43%	77.71%	96.49%
Percent of Farms with ETER less than 1.000	0.00%	0.96%	10.83%	41.21%
Percent of Farms with VFP less than $100,000	62.42%	11.46%	7.96%	5.75%
Percent of Farms with VFP between $100,000 and $250,000	32.80%	61.78%	42.68%	30.99%
Percent of Farms with VFP between $250,000 and $500,000	4.46%	21.02%	37.90%	41.21%
Percent of Farms with VFP greater than $500,000	0.32%	5.73%	11.46%	22.04%

[a] The first quartile is represented by farms with the lowest operating profit margin ratio. The fourth quartile is represented by farms with the highest operating profit margin ratio.

Table 4: Summary Statistics for Asset Turnover Ratio Quartiles.[a]

	Asset Turnover Quartile			
Item	First	Second	Third	Fourth
Value of Farm Production (VFP)	$128,948	$239,705	$303,437	$329,836
Net Farm Income	$23,715	$54,995	$65,066	$60,656
Interest	$9,664	$15,044	$18,580	$17,466
Unpaid Family and Operator Labor	$32,236	$42,666	$46,148	$47,803
Total Assets	$961,713	$990,642	$843,059	$542,930
Total Debt	$176,624	$272,945	$315,959	$289,275
Total Expense Ratio (TER)	0.816	0.771	0.786	0.816
Adjusted Total Expense Ratio (ATER)	1.066	0.949	0.938	0.961
Economic Total Expense Ratio (ETER)	1.553	1.188	1.077	1.023
Operating Profit Margin Ratio	0.0089	0.1142	0.1236	0.0919
Asset Turnover Ratio	0.1341	0.2420	0.3599	0.6075
Debt to Asset Ratio	0.1837	0.2755	0.3748	0.5328
Percent of Farms with Positive Net Cash Flow	87.90%	92.04%	95.22%	94.89%
Percent of Farms Financially Stressed	1.91%	5.10%	10.83%	21.09%
Percent of Farms with TER less than 1.000	77.07%	92.36%	94.27%	92.01%
Percent of Farms with ATER less than 1.000	30.25%	46.82%	59.87%	56.55%
Percent of Farms with ETER less than 1.000	0.32%	3.18%	13.69%	35.78%
Percent of Farms with VFP less than $100,000	51.91%	17.52%	9.87%	8.31%
Percent of Farms with VFP between $100,000 and $250,000	37.58%	47.77%	44.59%	38.34%
Percent of Farms with VFP between $250,000 and $500,000	8.91%	26.75%	32.80%	36.10%
Percent of Farms with VFP greater than $500,000	1.59%	7.96%	12.74%	17.25%

[a] The first quartile is represented by farms with the lowest asset turnover ratio. The fourth quartile is represented by farms with the highest asset turnover ratio.

Table 5: Number of Farms and Percent of Farms by Expense Ratio Categories.[a]

Item	Number of Farms	Percent of Farms
Top Total Expense Ratio Category		
First Category	72	5.74%
Second Category	99	7.89%
Third Category	180	14.34%
Fourth Category	307	24.46%
Fifth Category	597	47.57%
Bottom Total Expense Ratio Category		
First Category	51	4.06%
Second Category	102	8.13%
Third Category	200	15.94%
Fourth Category	346	27.57%
Fifth Category	556	44.30%
Top Adjusted Total Expense Ratio Category		
First Category	52	4.14%
Second Category	113	9.00%
Third Category	200	15.94%
Fourth Category	305	24.30%
Fifth Category	585	46.61%
Bottom Adjusted Expense Ratio Category		
First Category	87	6.93%
Second Category	109	8.69%
Third Category	159	12.67%
Fourth Category	263	20.96%
Fifth Category	637	50.76%
Top Economic Total Expense Ratio Category		
First Category	52	4.14%
Second Category	137	10.92%
Third Category	181	14.42%
Fourth Category	271	21.59%
Fifth Category	614	48.92%
Bottom Economic Total Expense Ratio Category		
First Category	133	10.60%
Second Category	102	8.13%
Third Category	109	8.69%
Fourth Category	200	15.94%
Fifth Category	711	56.65%

[a] Farms in the first category were in the top or bottom quartile for all four years. Farms in the second category were in the top or bottom quartile for three of the four years. Farms in the third category were in the top or bottom quartile for two of the four years. Farms in the fourth category were in the top or bottom category for one of the four years. Farms in the fifth category were not in the top or bottom category during the four year period.

Only 5.74%, 4.14%, and 4.14% of the farms were in the top quartile in terms of the total expense ratio, the adjusted total expense ratio, and the economic total expense ratio, respectively. However, there was a substantial proportion of farms, ranging from 48% to 57% of the farms depending on the expense ratio examined, were never in the bottom expense ratio category during the four-year period. Though difficult to maintain a sustained high level of performance, it was possible to avoid substantially below average performance.

Table 6 presents the summary statistics for the total expense ratio quartiles. Farms in the top total expense ratio quartile had an average total expense ratio of 0.625 while those in the bottom quartile had a ratio of 0.997. The farms in the bottom quartile barely covered non-opportunity costs. Approximately 25% of the farms in the bottom quartile were financially stressed.

Summary statistics for the adjusted total expense ratio quartiles are presented in Table 7. Farms in the top quartile had an average adjusted total expense ratio of 0.831 while those in the bottom quartile had a ratio of 1.289. None of the farms in the bottom two quartiles were able to cover accrual expenses, depreciation, and unpaid family and operator labour.

Table 8 presents the summary statistics for the economic total expense ratio quartiles. Farms in the top quartile had an average economic total expense ratio of 0.978 while those in the bottom quartile had a ratio of 1.747. On average, only the farms in the top quartile were able to cover all costs, including opportunity costs. Of the farms in the top quartile, approximately 53% of the farms were earning an economic profit. The economic total expense ratio can be used to measure economies of size. Given the trend in farm size as measured with the value of farm production going from the first to the fourth category or from a low economic total expense ratio to a high economic total expense ratio, there appears to be substantial economies of size in this sample of farms.

The results in Tables 5-8 suggest that weather and other external factors made it difficult for a farm to consistently be in the top quartile over time. However, approximately one-half of the farms were able to stay out of the bottom expense ratio quartiles during the four-year period. Moreover, using four-year average data, there was a substantial difference in financial performance between farms in the top and bottom

Table 6: Summary Statistics for Total Expense Ratio Quartiles.[a]

Item	Total Expense Ratio Quartile			
	First	Second	Third	Fourth
Value of Farm Production (VFP)	$263,122	$284,456	$263,873	$190,262
Net Farm Income	$98,795	$66,329	$38,901	$528
Interest	$9,814	$15,032	$17,956	$17,929
Unpaid Family and Operator Labor	$52,377	$45,604	$39,868	$31,018
Total Assets	$982,289	$919,662	$753,669	$684,124
Total Debt	$200,788	$266,682	$296,607	$290,445
Total Expense Ratio (TER)	0.625	0.767	0.853	0.997
Adjusted Total Expense Ratio (ATER)	0.824	0.927	1.004	1.160
Economic Total Expense Ratio (ETER)	1.061	1.111	1.142	1.326
Operating Profit Margin Ratio	0.2137	0.1257	0.0644	-0.0660
Asset Turnover Ratio	0.2679	0.3093	0.3501	0.2781
Debt to Asset Ratio	0.2044	0.2900	0.3936	0.4246
Percent of Farms with Positive Net Cash Flow	98.72%	98.41%	95.54%	77.39%
Percent of Farms Financially Stressed	0.32%	3.18%	10.19%	25.16%
Percent of Farms with TER less than 1.000	100.00%	100.00%	100.00%	55.73%
Percent of Farms with ATER less than 1.000	87.86%	67.83%	36.31%	1.59%
Percent of Farms with ETER less than 1.000	28.12%	14.97%	9.24%	0.64%
Percent of Farms with VFP less than $100,000	17.89%	14.33%	18.79%	36.62%
Percent of Farms with VFP between $100,000 and $250,000	46.65%	43.95%	38.54%	39.17%
Percent of Farms with VFP between $250,000 and $500,000	24.28%	29.94%	31.53%	18.79%
Percent of Farms with VFP greater than $500,000	11.18%	11.78%	11.15%	5.41%

[a] The first quartile is represented by farms with the lowest total expense ratio. The fourth quartile is represented by farms with the highest total expense ratio.

Table 7: Summary Statistics for Adjusted Total Expense Ratio Quartiles.[a]

	Adjusted Total Expense Ratio Quartile			
Item	First	Second	Third	Fourth
Value of Farm Production (VFP)	$394,500	$296,312	$207,651	$103,668
Net Farm Income	$124,912	$56,306	$24,083	-$664
Interest	$16,138	$17,798	$17,381	$9,434
Unpaid Family and Operator Labor	$58,253	$44,577	$36,787	$29,268
Total Assets	$1,276,926	$853,335	$693,518	$516,903
Total Debt	$318,609	$300,835	$278,142	$157,310
Total Expense Ratio (TER)	0.683	0.810	0.884	1.006
Adjusted Total Expense Ratio (ATER)	0.831	0.960	1.061	1.289
Economic Total Expense Ratio (ETER)	1.025	1.110	1.221	1.566
Operating Profit Margin Ratio	0.2099	0.0996	0.0225	-0.1977
Asset Turnover Ratio	0.3089	0.3472	0.2994	0.2006
Debt to Asset Ratio	0.2495	0.3525	0.4011	0.3043
Percent of Farms with Positive Net Cash Flow	98.40%	99.04%	95.54%	77.07%
Percent of Farms Financially Stressed	0.00%	0.32%	22.61%	15.92%
Percent of Farms with TER less than 1.000	100.00%	100.00%	97.45%	58.28%
Percent of Farms with ATER less than 1.000	100.00%	93.63%	0.00%	0.00%
Percent of Farms with ETER less than 1.000	36.74%	14.97%	0.00%	0.00%
Percent of Farms with VFP less than $100,000	5.43%	6.37%	15.29%	60.51%
Percent of Farms with VFP between $100,000 and $250,000	33.55%	41.72%	58.28%	34.71%
Percent of Farms with VFP between $250,000 and $500,000	37.38%	41.08%	21.66%	4.46%
Percent of Farms with VFP greater than $500,000	23.64%	10.83%	4.78%	0.32%

[a] The first quartile is represented by farms with the lowest adjusted total expense ratio. The fourth quartile is represented by farms with the highest adjusted total expense ratio.

Table 8: Summary Statistics for Economic Total Expense Ratio Quartiles.[a]

	Economic Total Expense Ratio Quartile			
Item	First	Second	Third	Fourth
Value of Farm Production (VFP)	$434,712	$287,576	$187,970	$92,002
Net Farm Income	$112,137	$56,607	$27,676	$8,175
Interest	$24,632	$17,226	$12,976	$5,944
Unpaid Family and Operator Labor	$58,820	$44,664	$36,656	$28,747
Total Assets	$989,041	$876,976	$770,808	$702,939
Total Debt	$443,853	$293,064	$216,887	$101,491
Total Expense Ratio (TER)	0.742	0.803	0.853	0.911
Adjusted Total Expense Ratio (ATER)	0.877	0.958	1.048	1.224
Economic Total Expense Ratio (ETER)	0.978	1.121	1.284	1.747
Operating Profit Margin Ratio	0.1793	0.1014	0.0213	-0.1590
Asset Turnover Ratio	0.4395	0.3279	0.2439	0.1309
Debt to Asset Ratio	0.4488	0.3342	0.2814	0.1444
Percent of Farms with Positive Net Cash Flow	97.12%	97.77%	92.99%	82.17%
Percent of Farms Financially Stressed	6.71%	18.79%	10.19%	3.18%
Percent of Farms with TER less than 1.000	100.00%	97.13%	88.85%	69.75%
Percent of Farms with ATER less than 1.000	91.69%	59.55%	29.94%	12.42%
Percent of Farms with ETER less than 1.000	53.04%	0.00%	0.00%	0.00%
Percent of Farms with VFP less than $100,000	2.56%	3.18%	16.56%	65.29%
Percent of Farms with VFP between $100,000 and $250,000	26.52%	49.36%	60.19%	32.17%
Percent of Farms with VFP between $250,000 and $500,000	43.77%	36.94%	21.34%	2.55%
Percent of Farms with VFP greater than $500,000	27.16%	10.51%	1.91%	0.00%

[a] The first quartile is represented by farms with the lowest economic total expense ratio. The fourth quartile is represented by farms with the highest economic total expense ratio. quartiles. This result stresses the importance of benchmarking financial performance.

Summary and Conclusions

This paper examined the persistence of financial efficiency and performance measures for a sample of farms over a four-year period. Financial efficiency and performance measures included the profit margin ratio, the asset turnover ratio, the total expense ratio, the adjusted total expense ratio, and the economic total expense ratio.

Results indicated that it was relatively difficult for a farm to consistently be in the top quartile over time. However, using four-year average data, there was a substantial difference in performance between farms in the top and bottom quartiles. For example, farms in the top economic total expense ratio quartile had an economic total expense ratio of 0.978 and were on average earning an economic profit. In contrast, farms in the bottom economic total expense ratio quartile had an economic total expense ratio of 1.747 and were thus not even close to covering all of their costs.

Results suggest that using one year of data to benchmark is problematic. However, given the large difference in financial performance using four-year average data for each farm, it is essential that farms benchmark using average data for a longer period of time. The results also suggest that it is possible for farms to have a competitive advantage.

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