Examining Trends in Liquidity for a Sample of Kansas Farms

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Liquidity measures help gauge whether a farm or group of farms has the ability to meet short-term debt obligations. In addition to examining average liquidity values over time, most analysts want to know how many farms fall below specific liquidity thresholds. This article examines differences in liquidity among Kansas Farm Management Association (KFMA) farms with continuous data from 1998 to 2017. There were 190 KFMA farms with continuous data for the 20-year period. Farm types represented in this sample of farms include crop farms, crop/beef farms, and beef farms.

Estimating and Analyzing Liquidity

Commonly used liquidity measures include working capital to gross income, working capital per acre, and the current ratio. Working capital is measured by subtracting current liabilities from current assets. Current assets include cash, accounts receivable, supply inventories, crop inventories, and market livestock inventories. Current liabilities include accounts payable, operating lines of credit, and the portion of non-current loans due within the next year. The current ratio is computed by dividing current assets by current liabilities. The working capital to gross income measure can also be computed using gross revenue, value of farm production, or total expenses. Value of farm production is considered a more appropriate measure of gross income when the sample of farms includes both crop and livestock farms. This article uses working capital to value of farm production and the current ratio to measure liquidity.

Liquidity thresholds are typically used by analysts to determine whether a farm has an adequate liquidity position. The two thresholds examined for the working capital to value of farm production were 0.20 and 0.35. The second threshold (0.35) is a commonly used threshold by financial analysts and would be considered an adequate level of working capital to weather a one or two year downturn.   The first threshold (i.e., 0.20) depicts a situation where a farm may have trouble repaying loans. As with the working capital to value of farm production threshold of 0.35, a current ratio above 2.0 is considered adequate. A farm with a current ratio below 1.0 is not able to cover their current liabilities by selling all of their current assets, and therefore may have trouble repaying loans.

The characteristics of the KFMA farms with a working capital to value of farm production measure below and above 0.35 are compared. Similarly, farm characteristics for farms with a current ratio below and above 2.0 are compared. T-tests are used to determine

whether farm characteristics are significantly different among the liquidity categories for each liquidity measure. A p-value below 0.05 would indicate that the differences in the means between the liquidity categories is statistically significant at the 5% level.

In addition to comparing farm characteristics among the liquidity categories, correlation coefficients between working capital to value of farm production and farm characteristics, and the inverted current ratio and farm characteristics are computed. The inverted current ratio is used rather than the current ratio to avoid dividing by zero (i.e., some of the farms did not have current liabilities). Significance levels are reported for the correlation coefficients. A p-value below 0.05 would indicate that the correlation coefficient is statistically significant from zero at the 5% level.

KFMA Data

Figure 1 illustrates the annual averages for working capital to value of farm production for the sample of KFMA farms. Working capital reached a peak of $489,304 in 2014. Since then average working capital has declined to an average level of $372,812 in 2017. Working capital to value of farm production averaged 0.62 over the 20-year period. The working capital to value of farm production liquidity measure was above the average from 2009 to 2017.

Trends in the average current ratio for the sample of KFMA farms are depicted in Figure 2. The average current ratio during the 20-year period was 2.92. The current ratio was above the average ratio from 2008 to 2015. The current ratio peaked in 2012 at 4.26, and dropped to 2.76 in 2017. Though relatively lower in 2017 compared to its peak value, the current ratio in 2017 was still higher than the averages experienced prior to 2008.

As noted in the introduction, most analysts are interested in how liquidity measures vary among farms. To examine liquidity differences among farms, we identified the percentage of farms below the two thresholds for working capital to value of farm production. The two thresholds examined were 0.20 and 0.35. Figure 3 illustrates the trends in these two thresholds over the 20-year period. On average, over the 20-year period, the percentages of farms with a working capital to value of farm production below 0.20 and 0.35 were 23.8% and 36.8%, respectively. The 2017 percentages were 24.2% below the 0.20 threshold and 30.5% below the 0.35 threshold. The percentage of farms below the two thresholds increased substantially in 2015, 2016, and 2017. However, the 2017 threshold percentages were still smaller than they were prior to 2008.

The two thresholds examined for the current ratio were 1.0 and 2.0. The trends in these two thresholds are illustrated in Figure 4. On average, over the 20-year period, the percentages of farms with a current ratio below 1.0 and 2.0 were 11.0% and 33.2%, respectively. It is

important to note that farms with a current ratio below 1.0 are in a difficult situation. To repay debt, these farms would need to increase gross income, reduce expenses, refinance intermediate or long-term debt, sell intermediate or long-term assets, or infuse capital from off-the-farm to ensure that the current debt obligations are repaid. The percentage of farms with a ratio below 1.0 (below 2.0) was above average from 1996 to 2005 (1998 to 2007) and below average from 2008 to 2016 (2008 to 2016). The percentage of farms in 2017 with a current ratio below 1.0 and 2.0 was 12.6% and 35.3%, respectively. The percentage of farms below the two thresholds has increased dramatically during the last couple of years. The improvement in the current ratio experienced as a result of the large increase in ethanol production in 2007 has essentially disappeared. Similar results were noted for Illinois FBFM farms by Zwilling et al. (here).

Farm Characteristics by Liquidity Categories

Table 1 compares the farm characteristics for farms with a working capital to value of farm production ratio below and above the 0.35 threshold. To create the information in Table 1, 20-year averages for each farm were computed. The farms were then sorted into the two liquidity categories. The measures of liquidity depicted in Table 1 include the current ratio, working capital, working capital to value of farm production, and working capital per acre. As expected, all of these liquidity measures are significantly higher for the farms with a working capital to value of farm production ratio above 0.35. In addition, the farms with the higher liquidity measure had a higher net farm income, average total assets, operating profit margin ratio, and percentage of acres owned; and a lower debt to asset ratio and asset turnover ratio. Except for the results with respect to the asset turnover ratio, the differences between the two liquidity categories seem intuitive. The asset turnover ratio differences are puzzling at first glance. The results suggest that the farms with lower levels of liquidity are more fully using their assets. This can be explained by examining differences in average total assets and percentage of acres owned between the two groups. The farms in the higher liquidity category have a larger asset base, due largely to the fact that they own a larger proportion of their land. The asset turnover ratio is computed by dividing value of farm production by average total assets. Value of farm production is similar between the farms in the two liquidity categories. Thus, the relatively larger asset base for the farms in the high liquidity category results in a lower asset turnover ratio for this group of farms.

Comparisons of the farm characteristics for the farms with a current ratio below and above 2.0 can be found in Table 2. To create the information in Table 2, 20-year averages for each farm were computed. The four liquidity measures are substantially higher for the group of farms with an average current ratio above 2.0. Note that the average current ratio for the 20-year period for the group of farms in the low liquidity category was 1.38. The current ratio for this group varied from 0.42 to 1.98. The farms in the higher current ratio category had a higher net farm income; and a lower debt to asset ratio and asset turnover ratio. The difference in asset

turnover ratios between the two current ratio farm categories is relatively smaller than it was between the two working capital to value of farm production categories.

Correlation coefficients between the two liquidity measures and farm characteristics are reported in Table 3 and 4. Before discussing the correlation coefficients, it is important to make two points regarding these coefficients. First, the correlation coefficient between working capital to value of farm production and the inverse current ratio is -0.543. This suggests that the two liquidity measures contain similar information. Note, however, the correlation is not perfect, thus, the two measures do contain at least some unique information. Second, the correlation coefficients between the two liquidity measures and the farm characteristics contain additional information that is not found in Table 1 and 2. Rather than focusing on differences in farm characteristics between specific liquidity categories, the correlation coefficients examine the relationship between each liquidity measure and the full range of values for each farm characteristic.

The results in Table 3 indicate a positive and significant relationship between working capital to value of farm production and percentage of acres owned; and negative and significant relationships between working capital to value of farm production and the debt to asset ratio and the asset turnover ratio. Farms with higher leverage and farms with lower efficiency of use of assets are in a more difficult liquidity situation.

Table 4 presents the correlation coefficients between the current ratio and each farm characteristic. The same three variables as those noted above concerning the working capital to value of farm production measure were significantly correlated with the current ratio. The percentage of acres was significant and positively related to the current ratio; and the debt to asset ratio and the asset turnover ratio were significant and negatively related to the current ratio.
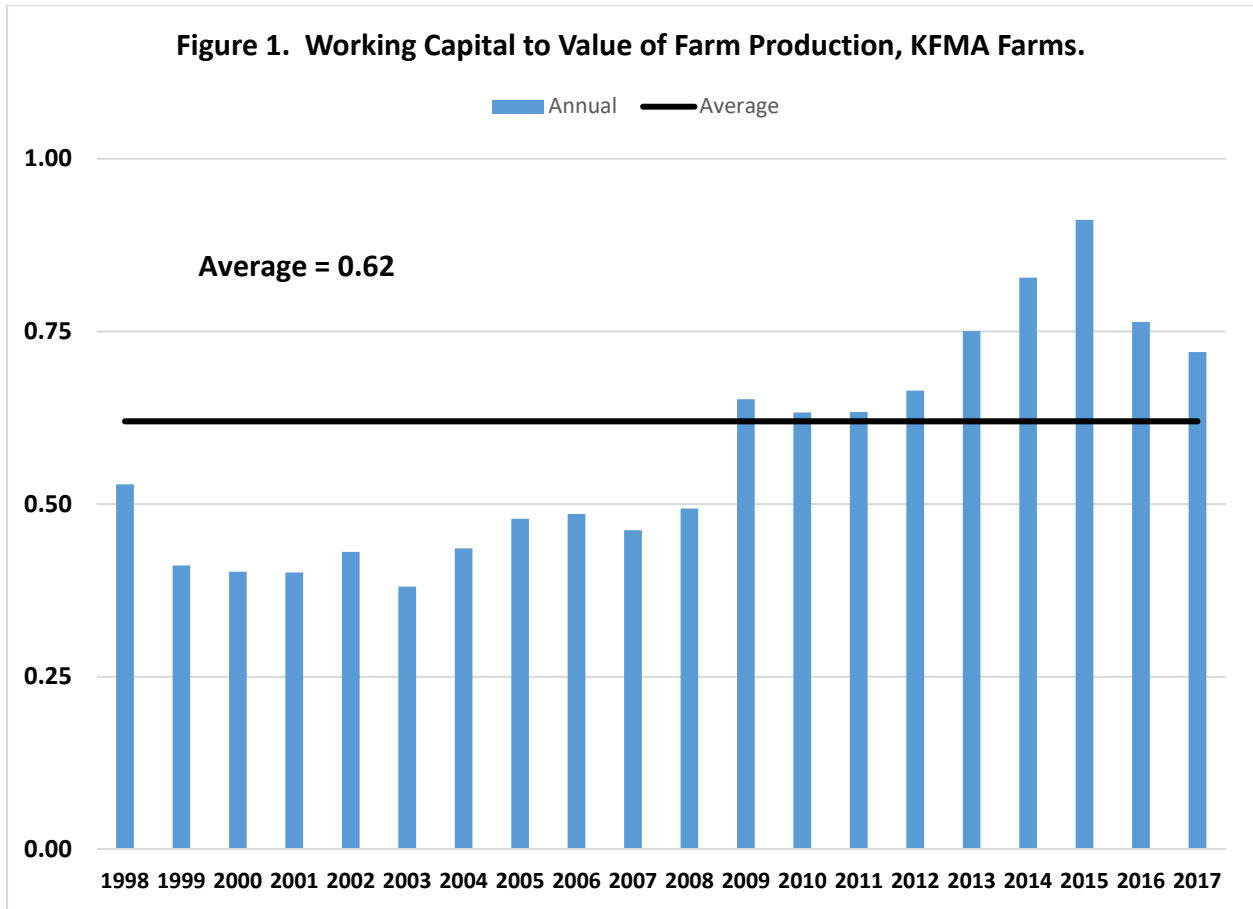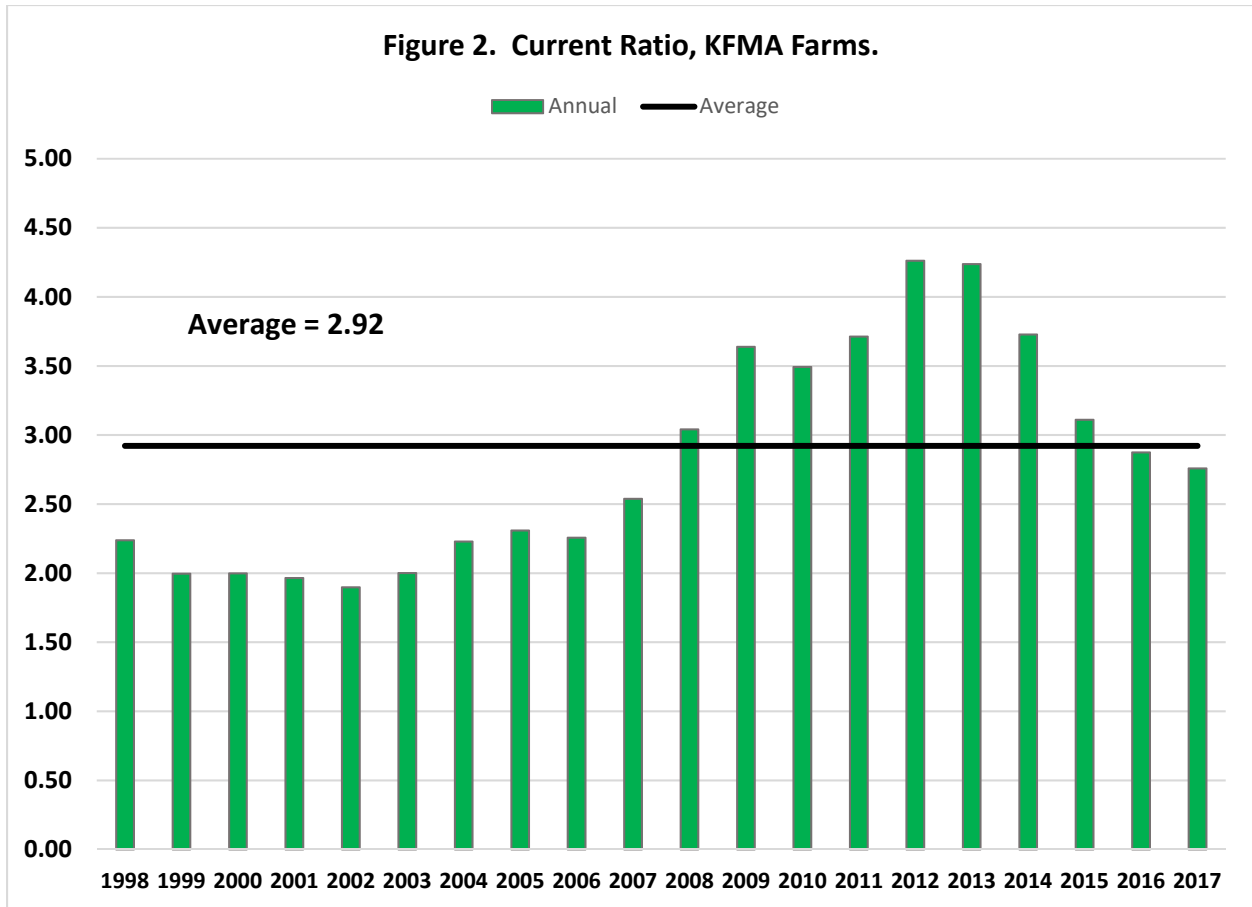
Summary and Implications

This article examined trends in liquidity for a sample of KFMA farms. Liquidity, measured using the current ratio, has declined substantially since its peak in 2012. The percentage of farms with a current ratio below 1.0 and 2.0 was 12.6% and 35.3% in 2017. In contrast, these values were only 5.8% and 16.8% in 2012. This suggests that farms are finding it increasingly difficult to repay loans in a timely fashion. Liquidity was positively related to the debt to asset ratio and the asset turnover ratio, and negatively related to percentage of acres owned. The highest absolute value for the correlation coefficients between liquidity and the farm characteristics was for the relationship between liquidity and the debt to asset ratio. Farms with more leverage had lower levels of liquidity.
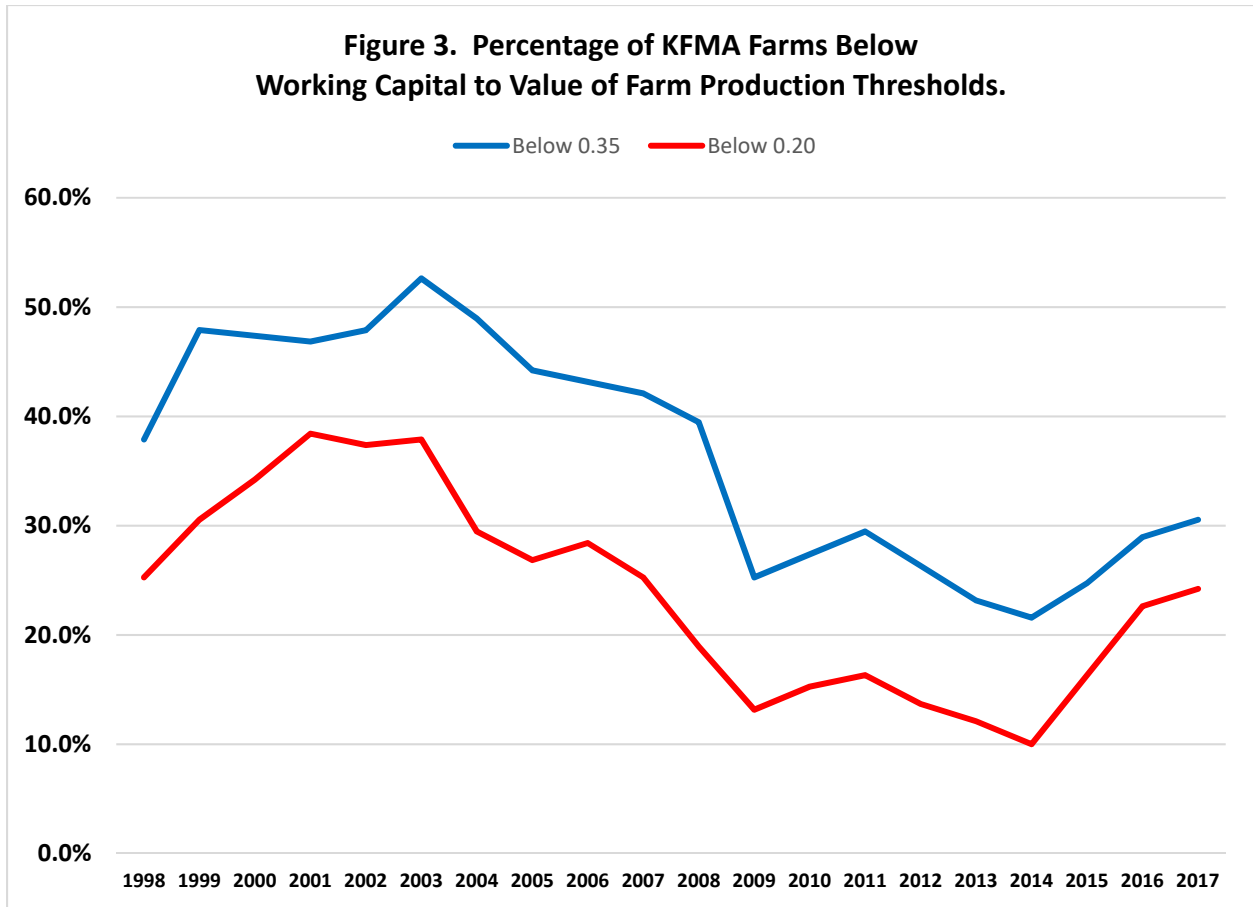
Liquidity measures in 2018 will depend on a multitude of factors including crop prices and yields, weather, and other factors, all of which are inter-related. Using current futures prices adjusted for basis, trend yields, and expected government payments; we expect the percentage of farms below the critical liquidity thresholds to increase in 2018.

Citation

Zwilling, B., B. Krapf, and D. Raab. "Cash is King – Revisited." *farmdoc daily* (8):134, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, July 20, 2018.

Figure 1. Working Capital to Value of Farm Production, KFMA Farms.

Average = 0.62

Figure 2. Current Ratio, KFMA Farms.

Average = 2.92

**Figure 3. Percentage of KFMA Farms Below
Working Capital to Value of Farm Production Thresholds.**

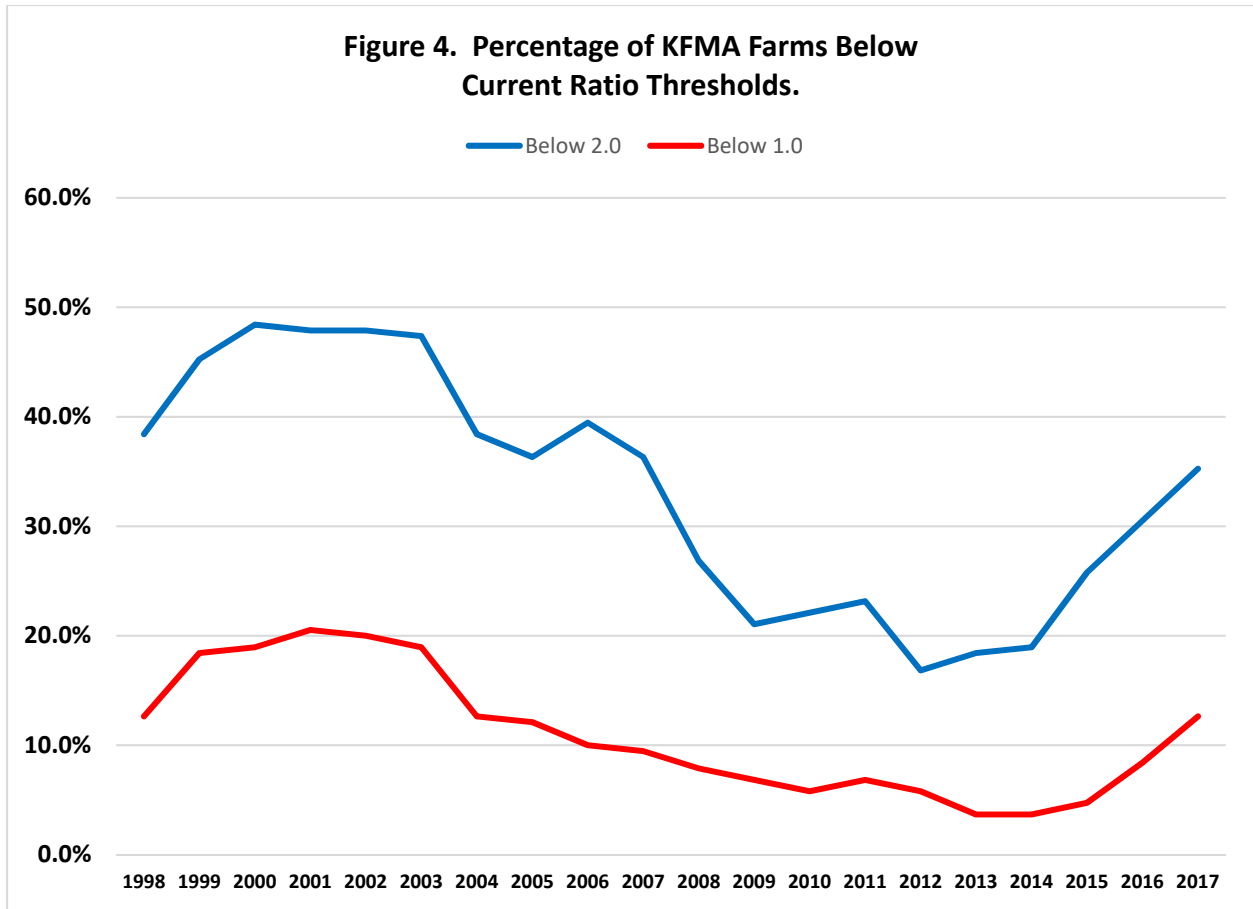Figure 4. Percentage of KFMA Farms Below Current Ratio Thresholds.

Table 1. Characteristics of KFMA Farms by Working Capital to Value of Farm Production Category.

Item	Below 0.35	Above 0.35	p-value
Number of Farms	59	131	
Net Farm Income	57,470	99,413	< 0.001
Value of Farm Production	395,684	404,380	0.852
Average Total Assets	1,243,117	1,815,734	0.001
Crop Labor Percentage	82.5%	80.8%	0.472
Current Ratio	1.35	3.93	< 0.001
Working Capital	57,752	335,097	< 0.001
Working Capital to Value of Farm Production	0.146	0.829	< 0.001
Working Capital per Acre	29	154	< 0.001
Debt to Asset Ratio	0.348	0.145	< 0.001
Operating Profit Margin Ratio	0.063	0.144	0.034
Asset Turnover Ratio	0.318	0.223	< 0.001
Return on Investment	0.020	0.032	0.075
Labor Efficiency	0.175	0.165	0.723
Machinery and Building Investment per Acre	197	195	0.439
Percentage of Acres Owned	24.4%	36.6%	0.001
Increase in Acres Operated	459	473	0.948

Table 2. Characteristics of KFMA Farms by Current Ratio Category.

Item	Below 2.00	Above 2.00	p-value
Number of Farms	57	133	
Net Farm Income	66,029	95,114	0.006
Value of Farm Production	428,536	390,170	0.427
Average Total Assets	1,606,549	1,651,366	0.835
Crop Labor Percentage	80.5%	81.7%	0.648
Current Ratio	1.38	5.05	< 0.001
Working Capital	94,189	315,311	< 0.001
Working Capital to Value of Farm Production	0.220	0.808	< 0.001
Working Capital per Acre	44	149	< 0.001
Debt to Asset Ratio	0.339	0.132	< 0.001
Operating Profit Margin Ratio	0.089	0.134	0.677
Asset Turnover Ratio	0.267	0.236	0.008
Return on Investment	0.024	0.032	0.371
Labor Efficiency	0.165	0.169	0.122
Machinery and Building Investment per Acre	189	198	0.073
Percentage of Acres Owned	29.4%	34.2%	0.164
Increase in Acres Operated	470	468	0.990

Table 3. Correlation Coefficients between Working Capital to Value of Farm Production and Farm Characteristics.

Item	r	p-value
Value of Farm Production	-0.088	0.228
Average Total Assets	0.136	0.061
Crop Labor Percentage	-0.036	0.626
Debt to Asset Ratio	-0.580	< 0.001
Operating Profit Margin Ratio	0.085	0.242
Asset Turnover Ratio	-0.379	< 0.001
Return on Investment	0.045	0.542
Labor Efficiency	0.082	0.258
Machinery and Building Investment per Acre	0.004	0.951
Percentage of Acres Owned	0.170	0.019
Increase in Acres Operated	-0.042	0.566

Table 4. Correlation Coefficients between Inverted Current Ratio and Farm Characteristics.

Item	r	p-value
Value of Farm Production	0.055	0.455
Average Total Assets	-0.055	0.449
Crop Labor Percentage	-0.048	0.509
Debt to Asset Ratio	0.772	< 0.001
Operating Profit Margin Ratio	-0.090	0.216
Asset Turnover Ratio	0.281	< 0.001
Return on Investment	-0.112	0.123
Labor Efficiency	-0.078	0.287
Machinery and Building Investment per Acre	-0.103	0.157
Percentage of Acres Owned	-0.151	0.038
Increase in Acres Operated	0.009	0.900