



# KANSAS FARM MANAGEMENT ASSOCIATION

Your Farm - Your Information - Your Decision

## NEWSLETTER

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### CREDIT QUALITY OF KANSAS FARMS

This article discusses trends in credit quality and the current distribution of credit quality ratings for farms participating in the Kansas Farm Management Association program. Using financial ratios briefly described below, the probability of default for each farm from 1973 to 2008 was computed and summarized.

In modeling credit risk, financial institutions rely on many measures, including liquidity ratios, profitability ratios, repayment capacity, firm size, and other business performance measures, along with non-economic measures such as character. Typically, a financial institution will give ratings to firms similar to that of a bond index such as the Standard and Poor's (S&P) which, from best to worst, is AAA, AA, A, BBB, BB, B, and CCC.

Using previous research, the probability of default was computed using the following equations:

$$(1) dv = -2.3643 - 0.00135 \text{ CDRC} - 0.0217 \text{ OE} - 0.00399 \text{ WC}$$

$$(2) \text{ probability of default} = \{(\exp(dv))/(1+(\exp(dv)))\} * 100$$

where  $dv$  is the dependent variable for the credit scoring regression, CDRC represents capital debt repayment capacity, OE represents owner equity percentage, and WC represents working capital percentage. The capital debt repayment capacity (CDRC) variable was computed using

information on repayment capacity, estimated principal and interest payments on term loans, working capital, and capital asset replacement. The working capital percentage (WC) variable was computed by dividing working capital by gross farm income. The relatively large absolute value on the coefficient for OE in equation (1) suggests that this variable is an important determinant of the probability of default.

Average ratio values can be used to illustrate how the probability of default was computed. The average values for CDRC, OE, and WC in 2008 were 124%, 74%, and 41%, respectively. Substituting these values into the equations above would result in a probability of default of 1.34%. Because the distribution of ratings is skewed, the probability of default using the average ratio values is lower than the average rating per farm in 2008 (1.84%).

Table 1 provides credit quality mapping information. This mapping is used to examine the trends in credit quality and the current distribution of credit quality among farms below.

Figure 1 presents the probability of default for Kansas farms. The graph also illustrates the range of ratings for the B, B+, BB-, and BB rating categories. In 1973, the average rating was BB. From 1974 to 1979, the average rating was a BB-. For most of the next three decades, the average rating was B+. However, the average rating from 1984 to 1986 and for 2002 was a B and the average rating for 2008 was a BB-. It is important to note that the probability

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of default in 2008 was the lowest it has been since 1979. Also, it is important to note that the probability of default can change rapidly. For instance, the probability of default went from a BB- rating in 1979 to a relatively low B+ rating in 1981.

The current distribution of credit quality for Kansas farms is presented in Table 2. A majority of the farms are rated BB-, BB, or BB+. However, approximately 9.7% of the farms are rated BBB- or higher. The remaining farms are rated "B" or "CCC". Firms with a "B" rating are typically assumed to have the capacity to meet credit obligations. However, adverse conditions could impair their ability to meet credit obligations. Firms with a "CCC" rating are vulnerable to nonpayment. Ability to meet credit obligations for these farms depends heavily on business and economic conditions.

Credit ratings, such as those presented in this article, are important for a couple of reasons. First, it is useful to track a credit rating for an individual firm or group of firms over time to ascertain their ability to handle adverse conditions. Second, interest rates can vary

substantially depending on a firm's credit rating. For example, using the bond market, the estimated difference in 30-year interest rates for a firm with a B and BB rating is 1.7%. Specifically, the firm with a B rating would have an estimated interest rate that is 1.7% higher than that of the firm with a BB rating. It is important to note that this difference in interest rates may not apply to production agriculture. However, at least some difference in interest rates would be expected for farms with these ratings.

As mentioned in previous newsletters (e.g., May 2009 and June 2009 newsletter articles on financial performance by farm size and farm type), profitability, measured using the net farm income ratio, profit margin, or similar measures, can vary significantly among farms. Individual farms are encouraged to benchmark their profitability measures with other producers in their association.

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**Table 1. Credit Quality Mappings.**

S&P Rating	Probability of Default Range
AAA	(0.00, 0.02]
AA+	(0.02, 0.03]
AA	(0.03, 0.04]
AA-	(0.04, 0.05]
A+	(0.05, 0.07]
A	(0.07, 0.09]
A-	(0.09, 0.14]
BBB+	(0.14, 0.21]
BBB	(0.21, 0.31]
BBB-	(0.31, 0.52]
BB+	(0.52, 0.86]
BB	(0.86, 1.43]
BB-	(1.43, 2.03]
B+	(2.03, 2.88]
B	(2.88, 4.09]
B-	(4.09, 6.94]
CCC+	(6.94, 11.78]
CCC	(11.78, 14.00]
CCC-	(14.00, 16.70]

Source: Lopez, J.A. "The Empirical Relationship Between Average Asset Correlation, Firm Profitability of Default and Asset Size." Federal Reserve Bank of San Francisco Working Paper, June 2002.

Figure 1. Probability of Default for Kansas Farms

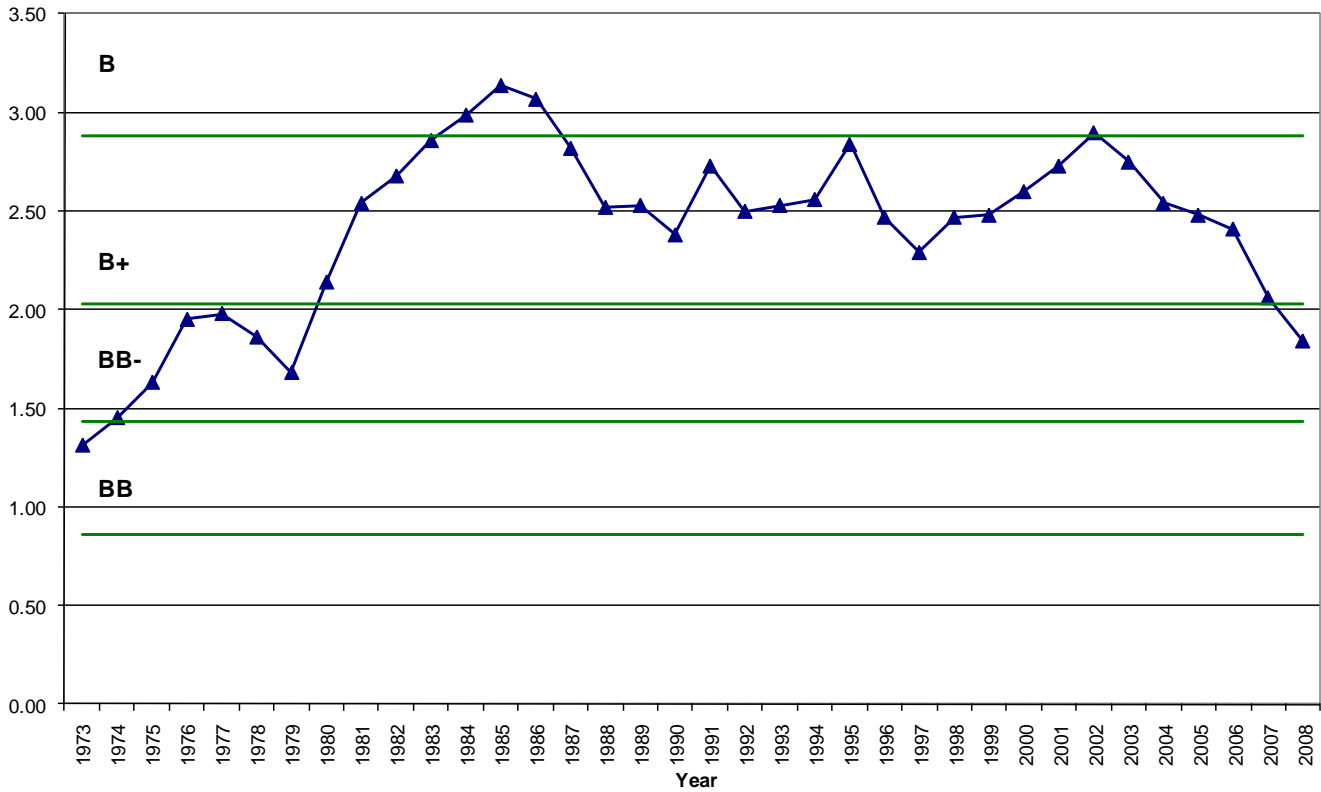


Table 2. Distribution of Credit Quality for Kansas Farms.

S&P Rating	Percentage of Farms
BBB+	0.2%
BBB	0.9%
BBB-	8.6%
BB+	21.1%
BB	25.5%
BB-	15.2%
B+	12.4%
B	7.6%
B-	5.8%
CCC+	2.3%
CCC	0.2%
CCC-	0.1%

## FACTORS IMPACTING COST EFFICIENCY IN EASTERN KANSAS

Using KFMA data for Northeast and Southeast Kansas, this article examines factors that impact cost efficiency in Eastern Kansas. Specifically, value of farm production, net farm income, the operating profit margin ratio, the asset turnover ratio, technical efficiency, cost efficiency, farm specialization, crop intensity, and the less tillage index were compared across cost efficiency quartiles.

The operating profit margin was computed by adding interest and subtracting unpaid operator and family labor from net farm income, and dividing the result by value of farm production. The asset turnover ratio was computed by dividing total assets by value of farm production. Technical efficiency measures the ability of a farm to produce on the production frontier and ranges from zero to one. A farm with an index of one is technically efficient. Cost efficiency measures the ability of a farm to produce on the cost frontier and ranges from zero to one. A farm with an index of one is cost efficient. Technical efficiency is an important component of cost efficiency. In addition to being technically efficient, a cost efficient farm is also using the optimal input mix. The crop intensity index was computed by dividing harvested acres by crop acres. Farms that double cropped had an index above 1.00. The less tillage index was computed by dividing herbicide and insecticide cost by crop machinery cost. A farm that has reduced tillage would have a relatively higher less tillage index.

Farms in the Northeast and Southeast Kansas Farm Management Associations with continuous data from 2003 to 2007 were included in the analysis. Table 1 reports the averages for these 424 farms. The average profit margin ratio was 0.1709 and the average asset turnover ratio was 0.2926. The average technical efficiency index was 0.7366. Approximately 5 percent of the farms were technically efficient. The average cost

efficiency index was 0.6168. Only five farms were cost efficient suggesting that there was room to improve cost efficiency on most farms. The average crop intensity index was 1.0531 and the average less tillage index was 0.2488.

Table 2 reports the farm characteristics by overall efficiency quartile. Comparisons will focus on the first quartile (the farms with the lowest overall efficiency indices) and the fourth quartile (the farms with the highest overall efficiency indices). In addition to having higher average technical and cost efficiency indices, the farms in the fourth quartile had substantially higher average operating profit margin and asset turnover ratios than the farms in the first quartile. The farms in the fourth quartile were on average larger, used double cropping to a greater extent, and had a higher less tillage index. The farms in the fourth quartile also had a relatively lower percent of their income derived from crops. It is important to note that many large farms in the sample were mixed crop and livestock farms. In summary, from the results presented in Table 2, it is evident that farm size, farm specialization, crop intensity, and tillage practices are important factors impacting cost efficiency.

This article presented information on cost efficiency for farms in Eastern Kansas. More information on financial performance and the Kansas Farm Management Association can be found on the following web site: [www.agmanager.info/kfma](http://www.agmanager.info/kfma). In particular, the May 2009 and June 2009 newsletters presented information on financial performance by farm size and farm type.

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**Table 1. Summary Statistics for 424 KFMA Farms in Eastern Kansas with Continuous Data from 2003-2007.**

Item	Average
Value of Farm Production (VFP)	\$350,240
Net Farm Income	\$90,957
Interest	\$18,568
Unpaid Family and Operator Labor	\$49,670
Total Assets	\$1,197,050
Operating Profit Margin Ratio	0.1709
Asset Turnover Ratio	0.2926
Technical Efficiency	0.7366
Cost Efficiency	0.6168
Percent of Value of Farm Production from Crops	74.88%
Percent of Labor Devoted to Crops	77.10%
Crop Intensity	1.0531
Less Tillage Index	0.2488

Source: Kansas Farm Management Association 2007 Databank.

**Table 2. Summary Statistics by Overall Efficiency Quartile.**

Item	Overall Efficiency Quartile			
	First	Second	Third	Fourth
Value of Farm Production (VFP)	\$117,014	\$272,875	\$424,168	\$586,902
Net Farm Income	\$17,572	\$55,782	\$102,666	\$187,808
Interest	\$7,181	\$19,887	\$22,780	\$24,425
Unpaid Family and Operator Labor	\$37,990	\$46,991	\$50,025	\$63,674
Total Assets	\$862,401	\$1,082,540	\$1,275,008	\$1,568,250
Operating Profit Margin Ratio	-0.1131	0.1051	0.1778	0.2531
Asset Turnover Ratio	0.1357	0.2521	0.3327	0.3742
Technical Efficiency	0.6076	0.7018	0.7731	0.8638
Cost Efficiency	0.4249	0.5897	0.6700	0.7825
Percent of Value of Farm Production from Crops	75.40%	79.34%	81.92%	62.85%
Percent of Labor Devoted to Crops	77.10%	81.18%	82.56%	67.55%
Crop Intensity	1.0094	1.0559	1.0635	1.0835
Less Tillage Index	0.1958	0.2521	0.2782	0.2691

## RECOMMENDATIONS FOR FURTHER READING

The purpose of this section of the newsletter is to briefly discuss articles and web sites that may be of interest to readers. In general, the articles discussed will not report on original research. Rather, the articles will contain citations to web sites and articles that discuss topics of general interest.

A recent publication by Tonsor, Mintert, and Schroeder entitled “U.S. Beef Demand Drivers and Enhancement Opportunities” discusses beef demand drivers and enhancement opportunities in the United States. Important demand drivers include prices, consumer expenditures, information about beef and nutrition, demand for more convenient meat products, and food safety. This publication is posted on the Ag Manager web site.

The Federal Reserve banks continue to publish articles pertaining to the financial crisis. A recent article by Aubuchon discusses the Fed’s response to the credit crunch. The author notes that U.S. house prices peaked in April 2007. By August 2007, the Federal Open Market Committee acknowledged the growing credit stress. Since August 2007, the Fed has addressed credit distress in three ways: by extending the duration of loans, by increasing acceptable collateral, and by extending the reach of lending facilities. As the author notes there is no such thing as a “quick fix”. Rather than providing a “quick fix”, the Fed’s actions have addressed liquidity constraints. Another article written by Anderson discusses monetary policy actions. The Fed’s recent actions are referred to as nontraditional monetary policies in this article. The author discusses how these recent actions differ from traditional monetary policies. The author notes that recent Fed programs have greatly increased the amount of assets held by the Fed and the monetary base. Many economists are concerned that, unless the increases in the monetary base are reversed promptly when economic activity expands,

inflation will accelerate. As the author notes, the recent increases in the monetary base are far greater than any previous increase in American history. The Fed’s ability to curtail inflation when the economy starts improving will certainly be tested in the near future. Both of these articles can be found on my contributor site.

In the March 2009 newsletter, I discussed an article by Auerbach and Gale that addressed the impact of recent economic events and policy interventions on federal budget projections. The authors have recently updated their analysis. This updated analysis is summarized below. The entire paper can be found on the web site of the Tax Policy Center ([www.taxpolicycenter.org](http://www.taxpolicycenter.org)). The authors’ conclusions are rather sobering. The authors indicate that deficits will average \$1 trillion per year from 2009 to 2019 and exceed \$1 trillion per year after 2019 under the current policy baselines. The longer run picture is even bleaker. The authors estimate the fiscal gap, the immediate and permanent increase in taxes or reduction in spending that would keep the long-term debt/GDP ratio at the current level. Closing the gap will require either a permanent reduction in non-interest spending of 24.3 percent or a permanent increase in revenues of 31.6 percent. The authors will periodically update their estimates and post them to the web site of the Tax Policy Center. The above analysis was taken from their June 2009 projections.

The web site for the Center for Farm Financial Management ([www.cffm.umn.edu](http://www.cffm.umn.edu)) provides information about programs conducted by the center as well as information pertaining to FINPACK, a financial planning and analysis software program. The programs of the center focus on farm financial planning. FINPACK helps individuals analyze their current financial position and level of performance, and provides

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a mechanism to explore the potential impact of alternatives on a farm's pro forma balance sheet and income statements.

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## 2009 RISK & PROFIT CONFERENCE

In the midst of maddening financial uncertainty, gathering pertinent, reliable economic information is one of the best ways to prepare for future business decisions. This is the goal of the 14th annual Department of Agricultural Economics Risk & Profit Conference scheduled for August 20-21, 2009 on the K-State campus at the Alumni Center.

As the conference theme "Economics: Macro, Micro, Maddening" suggests, the focus of the conference will cover an array of contemporary economic issues and how they relate to agriculture in Kansas, the nation, and the world. The first of three keynote speakers, Dr. Allen Featherstone, will open the conference Thursday with a talk entitled "Impacts of the Financial Market Crisis on the Agriculture Sector". This presentation will give a broad overview of how the current economic environment affects our financial bottom-lines.

According to Rich Llewelyn, conference coordinator, Risk and Profit gives participants the chance to interact with a wide-range of department faculty while getting up-to-date knowledge during the breakout sessions. This year's conference features twenty breakout sessions dealing with farm management, technology, marketing, and policy issues, and features more livestock topics than in previous years. Sessions will take place in the afternoon Thursday, with an evening speaker following. A trade show of displays and information by

vendors specializing in goods and services for producers and agribusinesses will also be available in the lobby concourse between sessions. Friday morning, after breakfast, the general session will feature Dr. James Mintert who will share his *Livestock Outlook*, and Dr. Mike Woolverton who will offer his *Grain Outlook*. Additional breakout sessions will follow the general session.

"One of the highlights I'm looking forward to is a keynote address, Friday afternoon, by our new University President, Dr. Kirk Schulz," said Llewelyn. "He's going to give an overview of his vision for K-State's future as a land-grant university. It will also give participants an idea of how he is going to manage within the midst of these tight economic times."

Registration is now open for the Risk and Profit Conference. An early bird special is available at the price of \$205.00 for the first person and \$185.00 for each additional person on the same registration until August 11. After August 11, the price for the conference is \$230.00 for each registration. Hotel accommodation information and other conference details are available online at [www.agmanager.info](http://www.agmanager.info) or by calling Rich Llewelyn at 785.532.1504.

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The Kansas Farm Management Association (KFMA) Newsletter is distributed monthly to provide farm management information to farm decision makers. Further farm management information can be found on the KFMA program website: [www.agmanager.info/kfma](http://www.agmanager.info/kfma); and, on the Extension Agricultural Economics website: [www.agmanager.info](http://www.agmanager.info). The Newsletter is edited by Michael Langemeier, Professor, Department of Agricultural Economics, Kansas State University.



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**Kansas State University Agricultural Experiment Station and Cooperative Extension Service.**

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