

Credit Quality of Kansas Farms

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<http://www.agmanager.info/KFMA/Newsletters/Research/Credit.pdf>

In modeling credit risk, financial institutions rely on many measures, including liquidity ratios, profitability ratios, repayment capacity and 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:

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

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

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 2014 were 96%, 81% and 51%, respectively. Substituting these values into the equations above would result in a probability of default of 1.15%. 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 2014 (1.47%).

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.

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]

Table 1. Credit Quality Mappings Source: Lopez, J.A. "The Empirical Relationship between Average Asset Correlation, Firm Probability of Default and Asset Size." Federal Reserve Bank of San Francisco Working Paper, June 2002.

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. From 2008 through 2014 the rating was a BB-. It is important to note that the probability of default in 2014 was the lowest it has been since 1974. The rating from 2013 to 2014 remained the same. This occurred due to a decrease in repayment capacity that was offset by an increase in working capital and owners equity. 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.

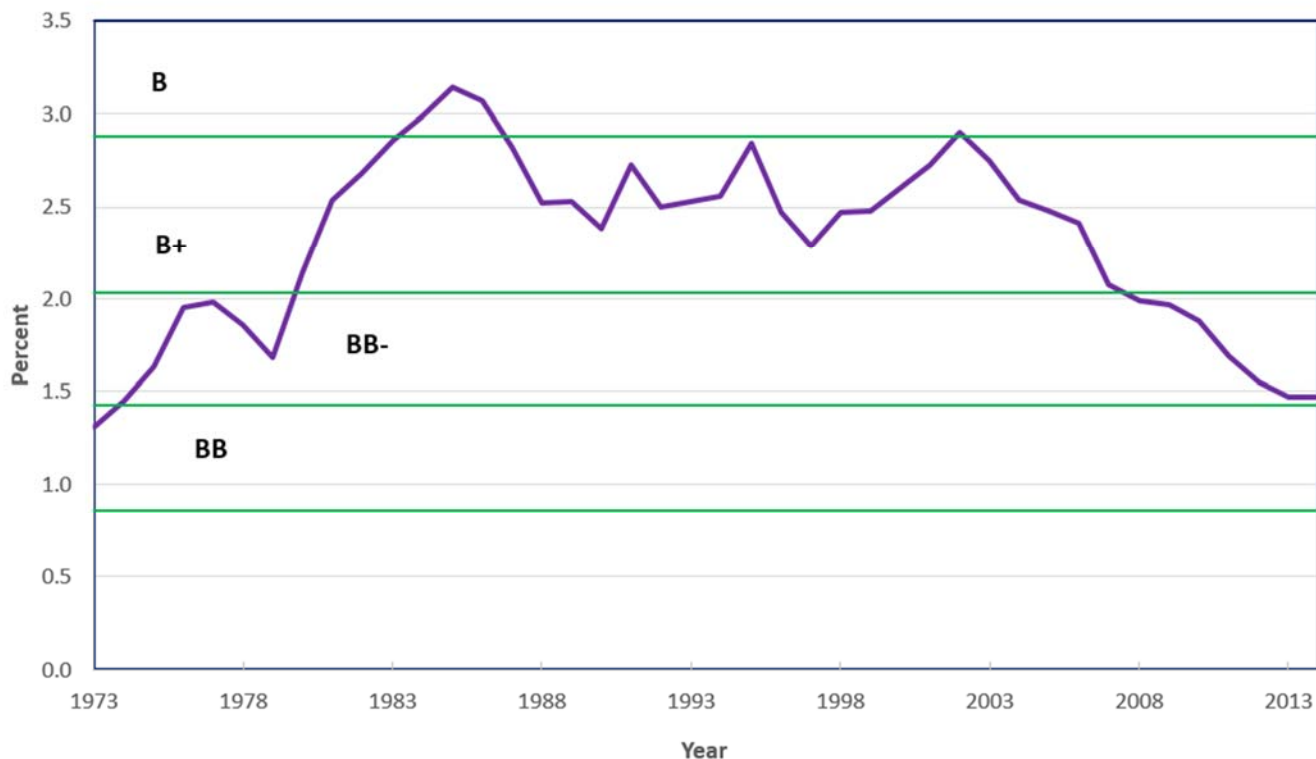


Figure 1. Probabiliy of Default for Kansas Farms

The current distribution of credit quality for Kansas farms in presented in Table 2. A majority of the farms (72.5%) are rated BB-, BB, or BB+. Approximately 9.7% of the farms are rated BBB- or higher. The remaining farms are rated below B+. 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.

S&P Rating	Percentage of Farms
BBB+	0.0%
BBB	1.2%
BBB-	8.5%
BB+	25.9%
BB	30.5%
BB-	16.1%
B+	9.4%
B	4.6%
B-	2.6%
CCC+	1.3%
CCC	0.0%
CCC-	0.0%

Table 2. Distribution of Credit Quality for Kansas Farms, 2014

Due to differences in relative price, cost, and production trends; credit quality varies by farm type. Table 3 presents the probability of default for common farm types exhibited by KFMA members in 2013 and 2014. The number of farms in parentheses indicates the number of farms of a specific farm type that had data for both years. The farms types “crop-irrigated” and “crop non-irrigated” saw increases in the probability of default in 2014 from 2013. The other farm types that have livestock as part of the operation saw decreases in the probability of default. At the end of 2014, the “crop-irrigated” farms averaged the highest probability of default and the “crop-cow herd” farms averaged the lowest probability of default. From 2013 to 2014, those farms that had livestock improved their financial position while those that were in crop production alone saw their financial position to decline on average.

Farm Type	2013	2014
Crop – Non-Irrigated (715 farms)	1.44%	1.51%
Crop – Irrigated (47 farms)	1.62%	1.83%
Crop – Beef (28 farms)	1.57%	1.42%
Crop – Beef Backgrounding (17 farms)	1.86%	1.52%
Crop – Cow Herd (106 farms)	1.28%	1.10%
Cow Herd (27 farms)	1.88%	1.52%
Dairy (19 farms)	1.71%	1.46%
General Farm (12 farms)	1.89%	1.54%

Table 3. Probability of Default by Farm Type, 2013 and 2014

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.

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