

Credit Quality of Kansas Farms

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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 2010 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 2010 were 135%, 73%, and 44%, respectively. Substituting these values into the equations above would result in a probability of default of 1.33%. 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 2010 (1.83%).

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.

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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, 2009, and 2010 was a BB-. It is important to note that the probability of default in 2010 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 10% 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.

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 2009 and 2010. The number of farms in parentheses indicates the number of farms of a specific farm type that had data for both years. The non-irrigated crop, irrigated crop, crop – cow herd, and general farm types had probabilities of default below 2%. In contrast, the crop – beef, crop – beef backgrounding, cow herd, and dairy farms had probabilities of default above 2%. Farms typed as “general farms” tend to be large and diversified while farms typed as crop – beef typically have crops, a cow herd, and a stocker or backgrounding enterprise. The crop – beef, and crop – beef backgrounding farms exhibited the highest probabilities of default in 2010.

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.

As mentioned in previous newsletters (e.g., May 2011 and June 2011 KFMA 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.

Figure 1. Probability of Default for Kansas Farms

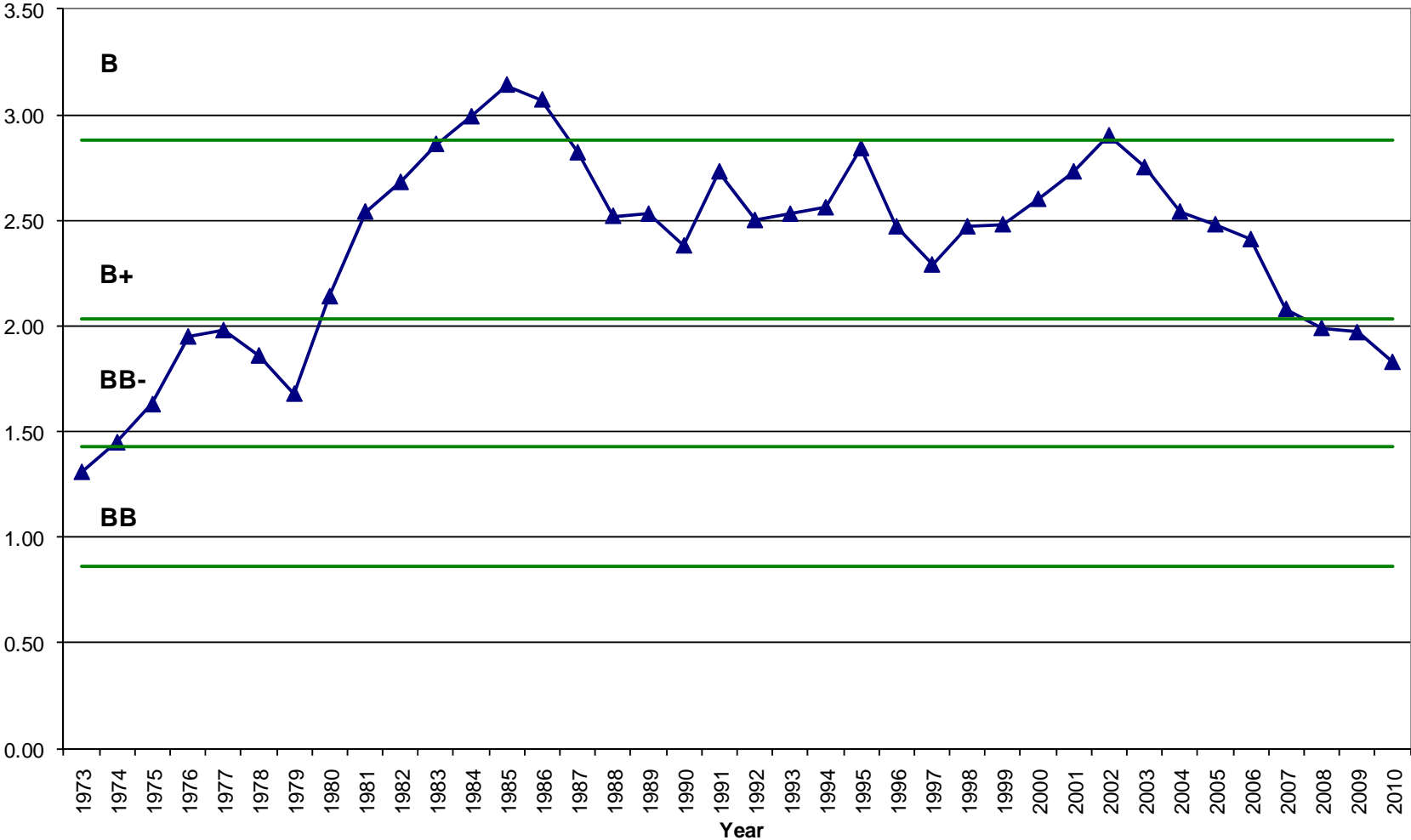


Table 1. Credit Quality Mappings.

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 Probability of Default and Asset Size." Federal Reserve Bank of San Francisco Working Paper, June 2002.

Table 2. Distribution of Credit Quality for Kansas Farms, 2010

S&P Rating	Percentage of Farms
BBB+	0.2%
BBB	1.0%
BBB-	9.0%
BB+	22.2%
BB	23.9%
BB-	16.3%
B+	11.4%
B	7.9%
B-	5.2%
CCC+	2.8%
CCC	0.1%
CCC-	0.1%

Table 3. Probability of Default by Farm Type, 2009 and 2010.

Farm Type	2009	2010
Crop - Non-Irrigated (894 farms)	1.90%	1.78%
Crop - Irrigated (46 farms)	1.75%	1.45%
Crop - Beef (38 farms)	2.14%	2.99%
Crop - Beef Backgrounding (31 farms)	3.13%	2.90%
Crop - Cow Herd (123 farms)	1.92%	1.73%
Cow Herd (27 farms)	2.65%	2.52%
Dairy (29 farms)	2.32%	2.20%
General Farm (23 farms)	1.65%	1.47%
