Is this farm boom different?

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Session 3: Who Leveraged the Farm?

Who Leveraged the Farm?

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Agricultural farmland was susceptible to two boom-bust cycles in the last century (1900s) and two other boom-bust cycles in the 1800s (Featherstone and Baker, and Melichar). Since the last agricultural land boom-bust (bubble) cycle from 1973 to 1986, a volume of literature has arisen that examines the characteristics that can lead to a boom-bust cycle (Schurle et al., 2012). Major themes in this literature indicate that not all explosive movements are bubbles (Hunter et al., 2003), that bubbles can occur when investors are trying to behave rationally (Shiller, 2000), and that bubbles can occur without uncertainty, speculation, or irrational behavior (Smith et al., 1988). Kindleberger (1978) identified three stages for the development of an asset bubble: 1) an economic shock that justifies higher prices and reflects structural change outside the experience of most investors, 2) the increased use of leverage and speculative instruments due to rising investor confidence, and 3) a herding effect where demand increases because prices are increasing.

The purpose of this paper is to examine the leverage condition of the sector, the second of Kindleberger's three conditions. The discussion will examine research from the most recent agricultural land boom-bust period that examined defaulted real estate loans from the 1970s and 1980s. Next the leverage situation and the corresponding probability of default in the 1970s and will be compared to the year-end 2010 situation using Kansas Farm Management Association (KFMA) farms. The financial situation at the national level using year-end 2010 data from the Agricultural Resource Management Survey (ARMS) is examined to understand potential differences between the financial situation in Kansas and nationally. Finally, the paper will conclude by examining the precursory conditions that could lead to a debt crisis and agricultural land boom-bust cycle similar to that which occurred in the 1980s.

Lessons from the Defaulted Loans in the 1980s

The most comprehensive analysis of the impact of debt on the financial crisis of the 1980s is a study by Featherstone and Boessen (1994). They examined the loan loss severity of 457 defaulted mortgages originated by Equitable Agribusiness, a division of The Equitable. Several important findings may be of value for comparing the current situation to the last boom-bust cycle. According to Featherstone and Boessen, the original loan balance on the defaulted loans was in excess of $161 million with an average effective rate of interest of 11.04 percent. The average origination loan to value ratio was 60.7 percent with a standard deviation of 10.1 percent. The average years of loan performance before default was 5.6 years with a standard deviation of 2.5 years.

Table 1 presents a schematic of the origination/default matrix for these loans. Roughly 75 percent of the loans that defaulted were originated from 1977 through 1980, the four years before the peak of nominal land values. Roughly 81 percent of the loans defaulted between 1983 and 1986, the four years before the end of the bust. Of the loans originated from 1977 through 1980 by Equitable Agribusiness, 10.9 percent defaulted. Thus, while a substantial amount of loans defaulted, it was a subset of all loans originated.

Table 1:
Comparison for Origination and Default Year for 457 Defaulted Equitable Agribusiness Loans

Origination	Default Year													
Year	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1991	Total
1967	-	-	-	-	-	-	-	-	1	-	-	-	-	1
1972	-	-	-	-	-	-	1	-	-	-	-	-	-	1
1973	-	-	1	-	-	-	-	-	1	-	-	-	-	2
1974	-	1	-	-	-	-	-	-	2	1	-	-	-	4
1975	-	-	1	-	-	2	1	-	1	1	-	-	-	6
1976	-	-	-	1	1	3	5	6	4	-	-	-	-	20
1977	1	-	3	1	6	7	12	25	14	4	-	2	-	75
1978	-	-	2	2	5	10	11	27	27	5	1	-	-	90
1979	-	-	1	1	4	9	19	23	27	3	2	-	-	89
1980	-	-	1	-	10	9	13	28	22	8	1	-	-	92
1981	-	-	-	1	4	3	3	14	4	1	-	-	-	30
1982	-	-	-	-	-	-	-	2	1	-	-	-	-	3
1983	-	-	-	-	-	-	5	10	7	2	-	-	1	25
1984	-	-	-	-	-	-	1	4	6	2	-	1	-	14
1985	-	-	-	-	-	-	-	1	2	2	-	-	-	5
Total	1	1	9	6	30	43	71	140	119	29	4	3	1	457

Source: Featherstone and Boessen (page 255)

Loans that defaulted in the last boom-bust cycle were made in a relatively short period of time and did not have an excessively high loan to value ratio (Featherstone and Boessen). Roughly one out of six loans that defaulted during the last land boom bust cycle had an origination loan to value ratio of less than 50 percent. The nominal interest rate on those loans (11.04%) was certainly much higher than current conditions (6.13% for 2009 and 2010, Agricultural Finance Databook). In addition, the loans made during the 1970s and 1980s were mostly variable interest rate products.

The real cost of borrowing for farmers is half of what it was during the last half of the 1970s. After adjusting for the average inflation rate during 1977 through 1980 period, the real cost of borrowing on those defaulted mortgages was 2.41 percent. Using the 6.13 percent average interest rate from Federal Reserve Tenth District for 2009 and 2010 (Agricultural Finance Databook and the personal consumption expenditures index from the St. Louis Federal Reserve Bank, the average real interest rate was 4.71% for 2009 and 2010. Thus while, the nominal cost of borrowing is 4.91 percent lower than those loans originated from 1977 to 1980 period, the real cost of borrowing is 2.3 percent higher compared to the 1977 to 1980 period.

Comparing the 1970s with the Current Situation

This section provides a discussion of the leverage and default situation over time using Kansas Farm Management Association (KFMA) farms. Each KFMA farm is viewed as a new potential borrower whether they currently borrow or not and uses a synthetic credit scoring model to estimate a default probability that is used to produce a pseudo Standard and Poor's (S&P) ranking. The synthetic credit scoring model was estimated from a sample of performing and defaulted farm loans by Featherstone, Roessler and Barry (2006) assuming each borrower was a new borrower to assess the probability that a loan will enter default status based on information available at loan origination. By using this model to assess the risks of each farm and assigning a synthetic credit rating, the riskiness of the KFMA farms from 1973 through 2010 can be compared systematically.

As discussed in Brewer et al. (2012), one way to think of credit models is to relate

them to a well-known benchmark such as S&P credit ratings. The S&P credit ratings are designed to provide relative rankings of creditworthiness including default likelihood, payment priority, recovery, and credit stability. The S&P basic ratings range from excellent (AAA) to poor (C). Debtors classified in the C rating classes are substantial risks and generally depend on positive economic conditions to be able to meet financial commitments. The D rating indicates default.

The farm record data were obtained from KFMA and used to calculate the probability of default and the corresponding credit rating for each farm. The synthetic probability of default for each farm is calculated using the approach suggested by Featherstone, Roessler, and Barry (2006). The equation for calculating probability of default is as follows:

ln(probability of default/[1-probability of default]) = -2.3643 - 0.00135(Repayment Capacity Percentage) -0.0217(Owner Equity Percentage) - 0.00399(Working Capital Percentage)   (1)

This equation was estimated by Featherstone, Roessler, and Barry using 157,853 loans from the Seventh Farm Credit District portfolio from 1995 through 2002 to determine the ability of financial performance ratios to predict the probability of default for customers of the Seventh Farm Credit District using loan origination data.

Following Brewer et al., the KFMA data were used to calculate the yearly financial ratios (Owner Equity Percentage, Working Capital Percentage, and Capital Debt Repayment Capacity) for each farm and used to estimate the probability of default for the individual farms using equation (1). Each farm is then assigned a credit rating based upon its probability of default for each year.

Estimates of the probabilities of default from S&P rating categories were matched with those default probabilities determined by Lopez (2002); who used KMV, a company that created and provided software to Moody's and S&P to determine the probabilities of default of their portfolios. The KMV methodology determines the estimated default frequency and categorizes it based on that company's individual risk classes. The data used to construct Lopez's grid are year-end 2001 information.

Definition of Variables

Following Featherstone, Roessler, and Barry, the probability of default is a function of three key financial variables: Capital Debt Repayment Capacity (CDRC), Owner Equity Percentage (OE), and Working Capital Percentage (WC).

CDRC is used to determine repayment capacity by measuring the ability of the borrower to repay principal and interest on term loans by comparing their cash flow to their debt requirements. The larger the ratio, the greater their ability to meet repayment needs. CDRC is calculated by dividing repayment capacity by the sum of annual principal and interest payments on term loans, working capital deficiency and capital asset replacement. Repayment Capacity is the result of net farm income from operations plus non-farm income plus term interest plus depreciation minus income taxes minus family living expenses minus non-farm expenses.

OE provides a measure of a borrower's solvency. This ratio is calculated by dividing net worth by total assets. In this analysis, the OE is restricted to be between 0 and 100 percent.

WC measures a firm's liquidity position as it relates to its revenue. It is calculated by dividing working capital by a measure of adjusted gross income. Working capital is calculated as current assets minus current liabilities. Adjusted gross income is gross receipts minus purchases for resale.

Data were obtained from the KFMA for the years of 1973 through 2010. The accrual KFMA data were used to estimate the ratios to be used in the probability of default analysis. The variables used include: farm identifier, year, gross farm income, economic depreciation, total expenses, net farm income, cash interest paid, income taxes, unpaid family and operator labor, non-farm wage, average current assets, average breeding livestock value, average non-current accounts receivable, average machinery and equipment, average buildings and improvement, average owned land value, average total assets, average current liabilities, average intermediate liabilities, average long-term liabilities, value of production, total acres, irrigated crop acres, non-irrigated crop acres, pasture acres, capital managed, and average net worth (Langemeier, 2003).

An adjustment was used to convert Kansas Farm Management data on machinery and land into a consistent market value series (Dumler, Kastens, and Dhuyvetter, 2001).

Not all farms report data during every year. Therefore, only farms that provided two consecutive years of data were used in the study. For instance, if a farm provided data for 1995, 1996, and 1997, then the change in the farm's financial position (migration) from 1995 to 1996 and from 1996 to 1997 could be studied. Therefore, the number of observations varied for each two year period from 1973 through 2010.

Financial Comparisons

The average probability of default for KFMA farms has fallen since 2002 when the average default probability was 2.90 percent (Figure 1). At the end of 2010, the default probability was 1.83% and was at the lowest level since 1979 when it was at 1.68%. Only four years, 1973, 1974, 1975, and 1979 had a lower default probability than 2010. While the average default probability is low, there is a distribution around that probability. Because during the last farm crisis only a subset of the loans made defaulted, it is important to examine the vulnerable tail of a distribution in addition to the average value. That vulnerable tail can be a driver of falling land values as farmland is released to the market to be purchased by other farmers.
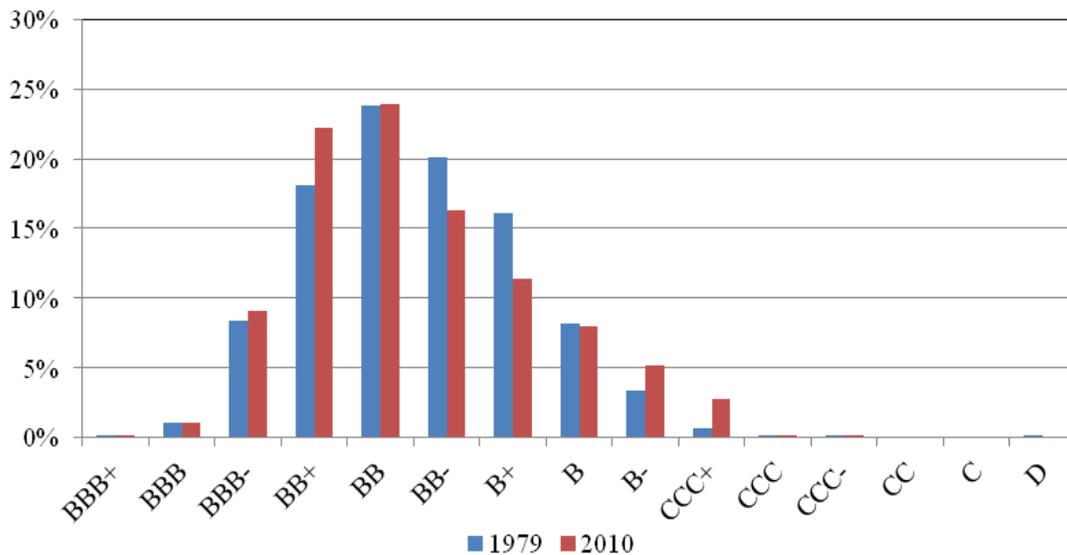
Figure 1:
Average Default Probability of Kansas Farm Management Association Farms
(1973 to 2010)
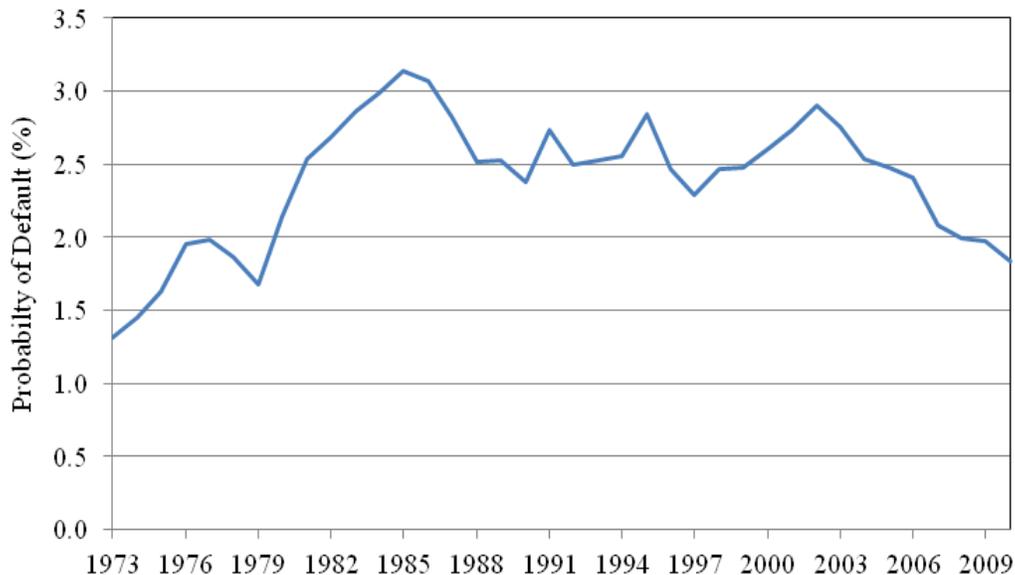
Figure 2 illustrates the distribution of the default probability for 2010 and 1979. There were 1,263 farms analyzed in 2010 and 1,932 farms analyzed in 1979. Farms that are rated below BB- have an expected default frequency of 2.03 percent or higher. In 2010, this represented 27.4 percent of the farms and in 1979, 28.6 percent of the Kansas farms. Farms that are rated below B have an expected default frequency of 4.09 percent or higher. In 2010, this represented 8.1 percent of the farms while in 1979, this represented 4.3 percent of the farms. Thus, while the average default probability is nearly the same in 1979 and 2010, the percentage of farms with lower credit quality is higher at the end of 2010 than in 1979.

Figure 2:
Distribution of Pseudo S&P Credit Quality of
**Kansas Farm Management Association Farms**
1979 and 2010

The quality of credit can change quickly. From 1979 to 1981[1], the average default probability increased from 1.68 percent to 2.54 percent (Figure 1). The distribution of farms that had above a 2.03 percent probability of default increased from 27.4 percent in 1979 to 43.5 percent in 1981 and the distribution of farms that had a probability of default greater than 4.09 percent increased from 4.3 percent of the farms in 1979 to 16.2

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[1] There were 1,973 farms analyzed in 1981.

percent of the farms in 1981 (Figure 3). Thus, the financial situation of Kansas farms changed much over that two-year period.

Figure 3:
Distribution of Pseudo S&P Credit Quality of
**Kansas Farm Management Association Farms**
1979 and 1981
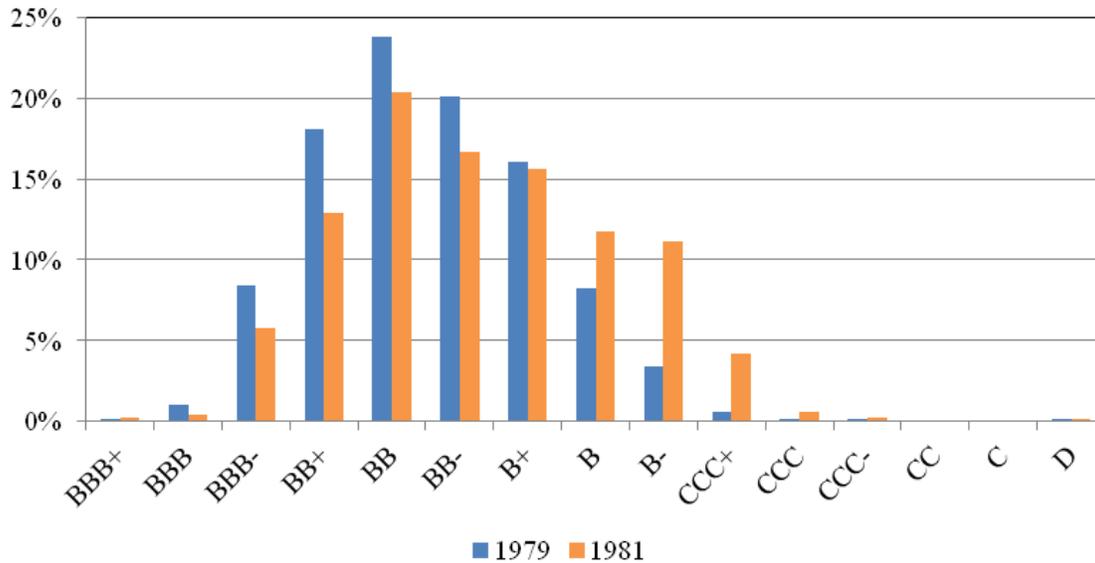
The probability of default is a function of three component factors from equation 1, the owner's equity percentage (leverage), the working capital percentage (liquidity), and the capital debt repayment capacity. Featherstone, Roessler and Barry (2006) found that changes in leverage have larger effects on changes in the probability of default than liquidity which have larger effects than the capital debt repayment capacity. Figure 4 examines the component ratios from 1973 through 2010. The equity to assets ratio and the working capital percentage ratios have been fairly consistent during the period. The maximum equity to assets ratio occurred in 1979 (79.4%) and the minimum occurred in 1986 (63.0%). The maximum working capital percentage occurred in 1974 (63.3%) and the minimum occurred in 1984 (16.4%). The maximum capital debt repayment capacity occurred in 1973 (277.0%) and the minimum occurred in 1981 (16.3%). The 2010 levels were 73.2 percent for the equity to assets ratio, 43.5 percent for the working capital percentage, and 134.6 percent for the capital debt repayment capacity ratio. During 1979, the equity to assets ratio was 75.4%, the working capital percentage ratio was 27.5 percent, and the capital debt repayment capacity ratio was 152.8 percent. Equity to assets

was higher, the working capital percentage was lower, and the capital debt repayment capacity was higher in 1979 than 2010.

Figure 4:
Working Capital, Equity to Asset, and Debt Repayment Capacity Ratios
for KFMA Farms,
1973 to 2010
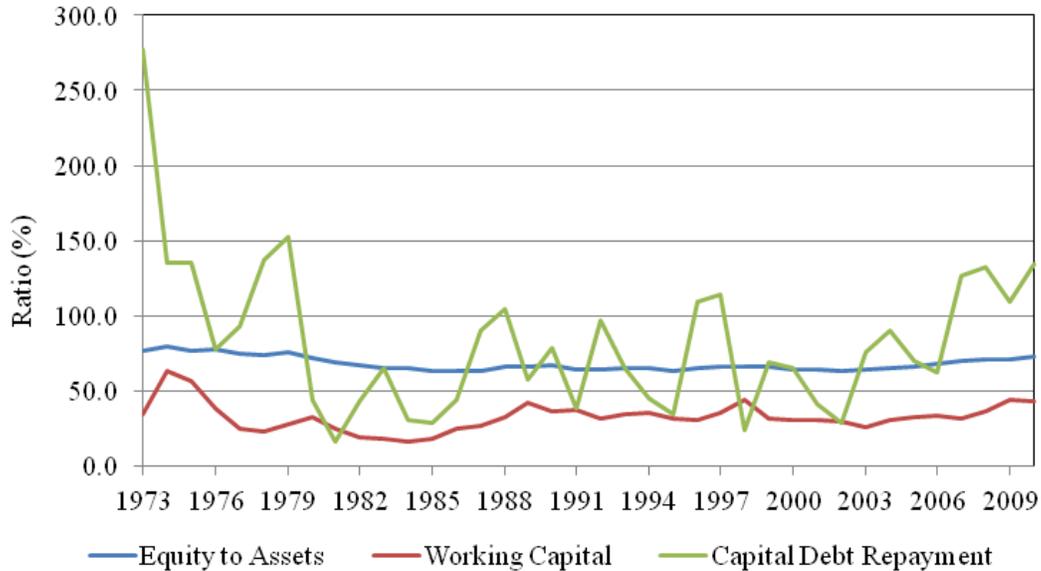
While the debt to assets position in 2010 is low from a historical Kansas perspective, it was lower in 1979 than it is in 2010. To further compare the situation in 1979 and 2010, Figure 5 compares the distribution of the debt to asset ratios[2]. The mean debt to asset ratio in 1979 was 24.6 percent and was 26.8 percent in 2010. While the mean debt to asset ratio is similar in 1979 and 2010, the percentage of farms with more than 40 percent debt to assets in 1979 was 19.4 percent and was 25.6 percent in 2010. The percentage of farms with more than 70 percent debt to assets in 1979 was 1.3 percent in 1979 and 5.9 percent in 2010. Thus, the distribution of farms with fairly high debt to asset ratios is higher in 2010 than in 1979.

As discussed above, the quality of credit can change quickly. From 1979 to 1981, the equity to asset ratio fell from 75.4 percent to 69 percent, the working capital percentage fell from 27.5 percent to 24.6 percent, and the debt repayment capacity fell

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[2] The debt to asset ratio is 1 minus the equity to asset ratio.

from 152.8 percent to 16.3 percent (Figure 4). Thus, the two major drivers of the increased default probability and the land boom-bust cycle were an increase in the use of debt relative to equity and a dramatic decrease in the debt repayment ratio. The equity to asset ratio continued to fall to 63.0 percent in 1986 when land values also stabilized. The distribution of farms that had more than 40 percent debt to assets increased from 19.4 percent in 1979 to 32.2 percent in 1981 and the distribution of farms that had more than 70 percent debt to assets increased from 1.3 percent of the farms in 1979 to 5.9 percent of the farms in 1981 (Figure 5). Thus, the leverage situation of Kansas farms changed much from 1979 to 1981.

Figure 5:
Distribution of Debt to Assets Ratio of
**Kansas Farm Management Association Farms**
1979 and 1981
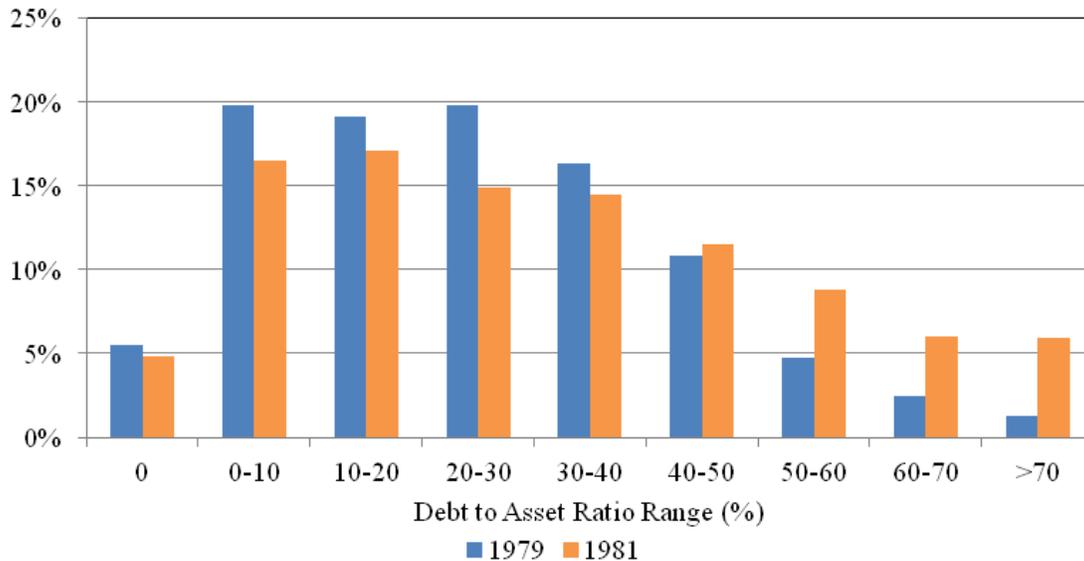
The crisis in the 1980s originated from a precipitous drop in income and an offsetting increase in the cost of debt that decreased the capital debt repayment capacity from 152.8 percent to 16.3 percent in two years. This initiated a decline in land values that exacerbated the crisis. A comparison of the current situation on Kansas farms with the situation in 1979 allows one to make several important conclusions. First, the probability of default was lower in 1979 than it is during 2010. Second, the leverage

situation in 1979 is comparable to that in 2010, on average, although there is a higher percentage of farms with more than 40 percent debt to assets and more than 70 percent debt to assets in 2010, than in 1979 (Figure 6). The farms with more than 70 percent debt to assets in 2010 more closely match the percentage in 1981 than 1979. However, while the leverage situation is comparable to 1979, the agricultural sector may not necessarily undergo the same outcome as in the early 1980s.

Figure 6:
Distribution of Debt to Assets Ratio of
Kansas Farm Management Association Farms
1979 and 2010
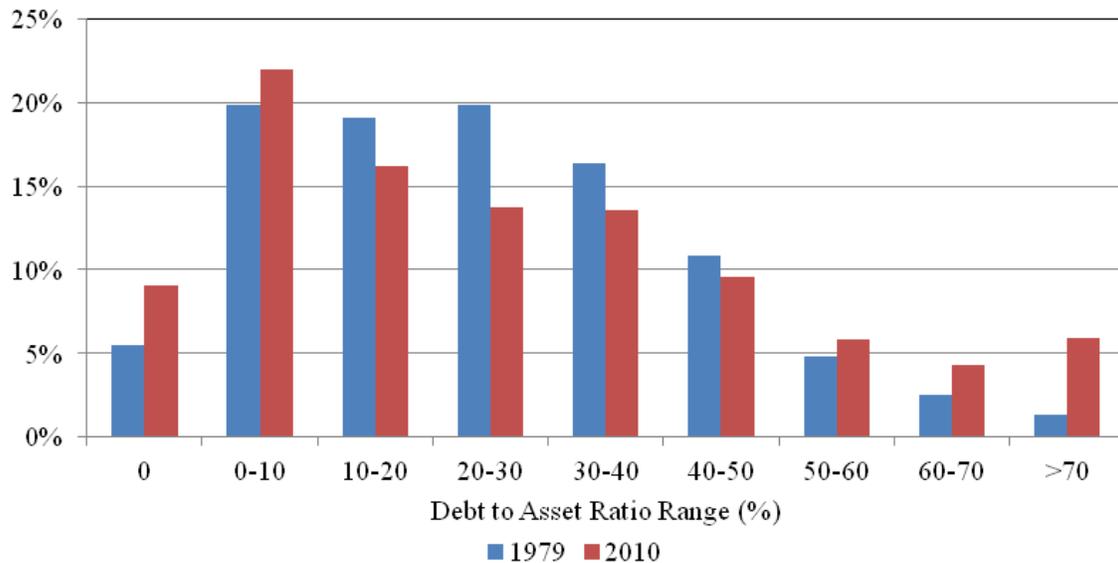
Understanding the U.S. Situation

   While it would be ideal to have performed the previous analysis using national numbers, data are not available for the same type of analysis back through the previous boom-bust cycle. However, more recent data are available to partially understand whether the situation in Kansas is similar to that nationwide. Brewer et al. (2012) examined the probability of default using Agricultural Resource Management (ARMS) Farms from 1996 through 2010. The probability of default was calculated for each farm observation and then pooled. The range of farm observations was 9,573 in 1996 to 21,578

in 2010. The ARMS is a stratified statistically drawn sample to be representative of U.S. farms though larger farms are sampled at a heavier rate to ensure representativeness.

The average working capital, equity to assets and capital debt repayment ratios for the U.S. indicate that from 1996 to 2010, the equity to assets ratio remained steady, the debt repayment capacity ratio increased, and the working capital percentage increased over the time period (Figure 7). This resulted in a probability of default that was lower than that for Kansas Farm Management Association farms, although the general trend between the default probabilities exhibited a similar pattern (Figure 8). The correlation between the USDA numbers and the Kansas Farm Management Association numbers was 0.73 numerically confirming the general trend in Figure 8.

Figure 7:
Working Capital, Equity to Asset, and
Debt Repayment Capacity Ratios for ARMS Farms
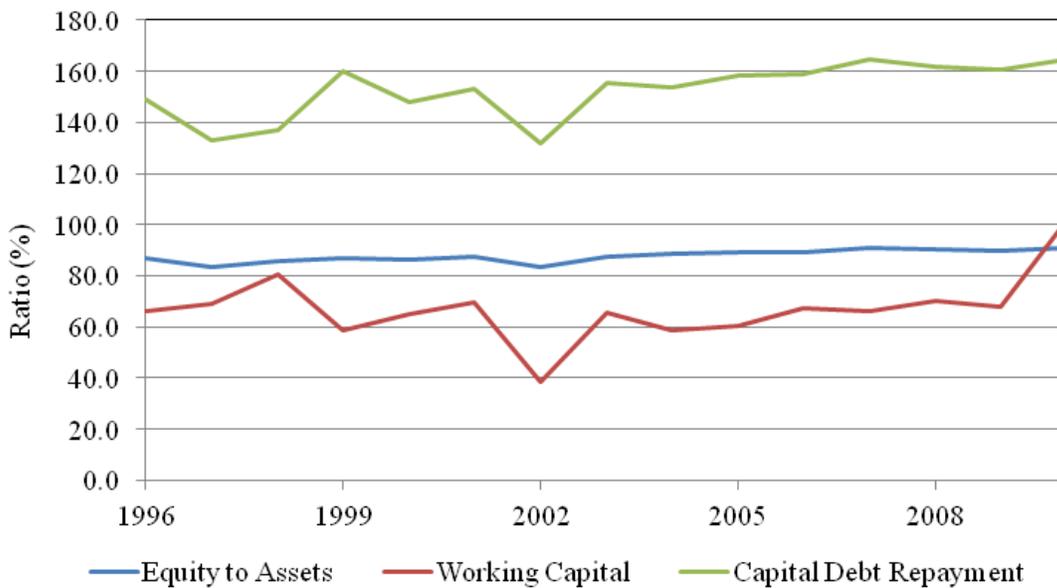**1996-2010**

Figure 8:
Average Default Probability for
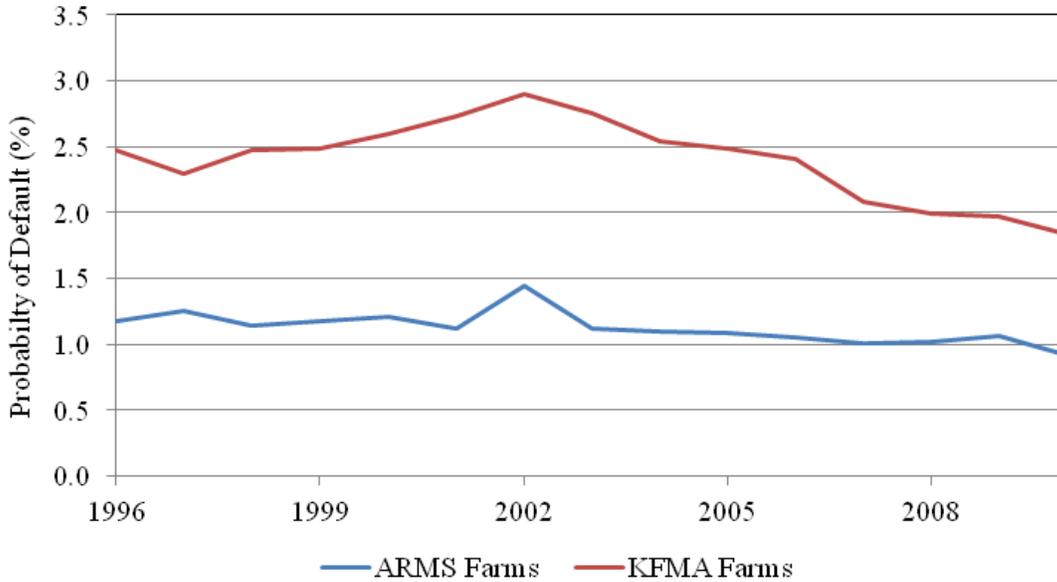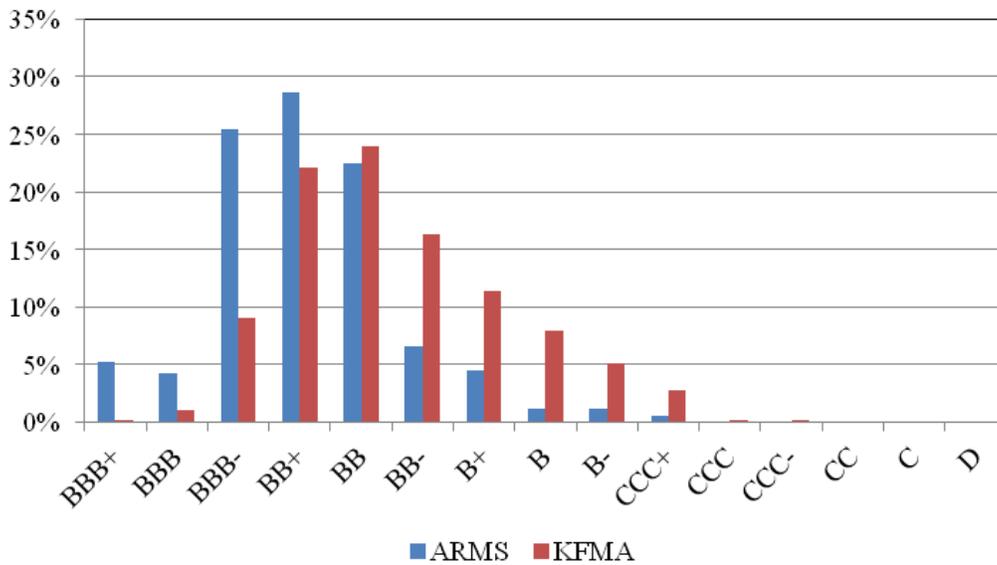**ARMS Farms and Kansas Farm Management Association Farms**
1996 to 2010

Figure 9:
Distribution of Pseudo S&P Credit Quality of
ARMS and Kansas Farm Management Association Farms
2010

The distribution of the probability of default between the ARMS farms and the KFMA farms are compared for 2010 (Figure 9). Farms that are rated below BB- have an expected default frequency of 2.03 percent or higher. In 2010, this represents 27.4 percent of Kansas farms and 7.3 percent of the USDA ARMS farms. Farms that are rated below B have an expected default frequency of 4.09 percent or higher. In 2010, this represented 8.1 percent of the Kansas farms while this represented 1.6 percent of the USDA ARMS farms. Thus, it appears that the USDA ARMS farms have a lower probability of default than the KFMA farms.

Figure 10:
Average Probability of Default by Sales Class for USDA ARMS Farms
1996-2010
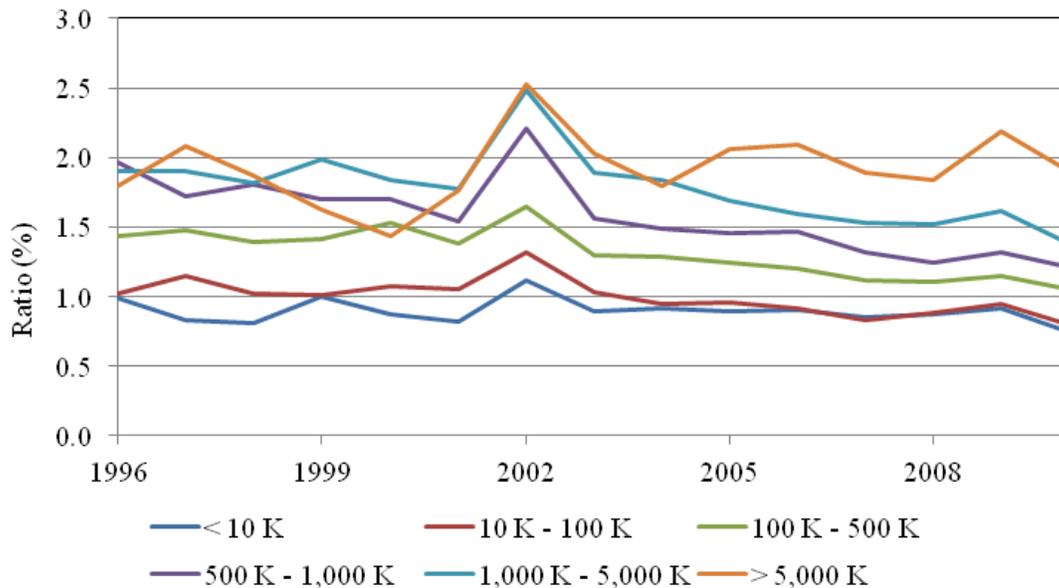
Figure 10 shows the probability of default for all ARMS farms by sales class from Brewer et al. The probability of default has generally decreased for each of the sales classes except for those farms with sales of more than $5 million which increased slightly from 1996 through 2010. More importantly, the farms that are most vulnerable are those in the larger sales class. The probability of default for KFMA farms by sales class does not illustrate the consistent pattern that the USDA numbers illustrate (Figure 11).

Figure 11:
Average Probability of Default by Sales Class for KFMA Farms
1996-2010

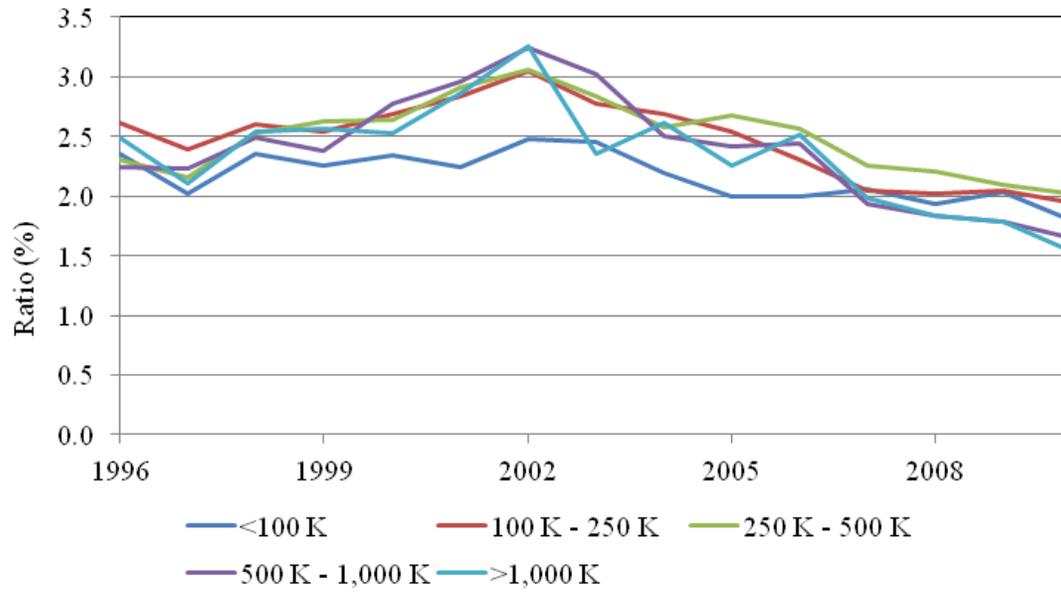**Table 2. Debt to Asset Ratio by Sales Class for USDA ARMS Farms for Kansas and Kansas Farm Management Association Farms**

	All	<100 K	100 K - 250 K	250 K - 500 K	500 K - 1,000 K	>1,000 K
			USDA ARMS Farms for Kansas			
2003	16.0	12.4	14.4	10.6	25.0	22.1
2004	18.0	9.8	17.9	32.1	9.7	24.4
2005	15.2	9.1	12.2	15.5	19.6	29.8
2006	15.4	6.3	15.6	15.8	18.4	31.5
2007	13.2	8.3	11.8	12.7	17.2	21.3
2008	11.2	4.2	10.8	10.9	15.5	13.6
2009	15.2	7.1	10.4	12.6	20.2	26.8
2010	12.4	7.5	9.9	11.9	13.5	19.0
			Kansas Farm Management Farms			
2003	36.5	27.1	36.6	40.5	44.4	43.2
2004	35.2	25.0	35.8	38.7	39.8	44.4
2005	33.3	21.6	33.0	38.2	37.3	40.6
2006	29.1	20.8	25.3	32.4	31.7	35.5
2007	30.0	22.9	25.6	33.3	32.3	35.6
2008	29.6	22.7	25.6	32.5	31.1	33.1
2009	28.7	22.7	26.1	30.9	29.3	31.9
2010	26.9	20.9	25.3	31.5	29.0	32.0

Source: USDA ARMS

The probability of default for all ARMS farms is lower than that for KFMA farms. This leads to questions on whether Kansas farms differ from U.S. farms as a whole or whether there are other issues. Table 2 examines the difference in debt to asset ratios for the KFMA farms and the USDA ARMS farms. The debt to asset ratios are substantially higher for the Kansas Farm Management Association farms than for the USDA ARMS farms. This pattern occurs across all size groups.

Figure 12:
Comparison of the Percentage of ARMS Farms and
KFMA Farms in Kansas without Debt
2010
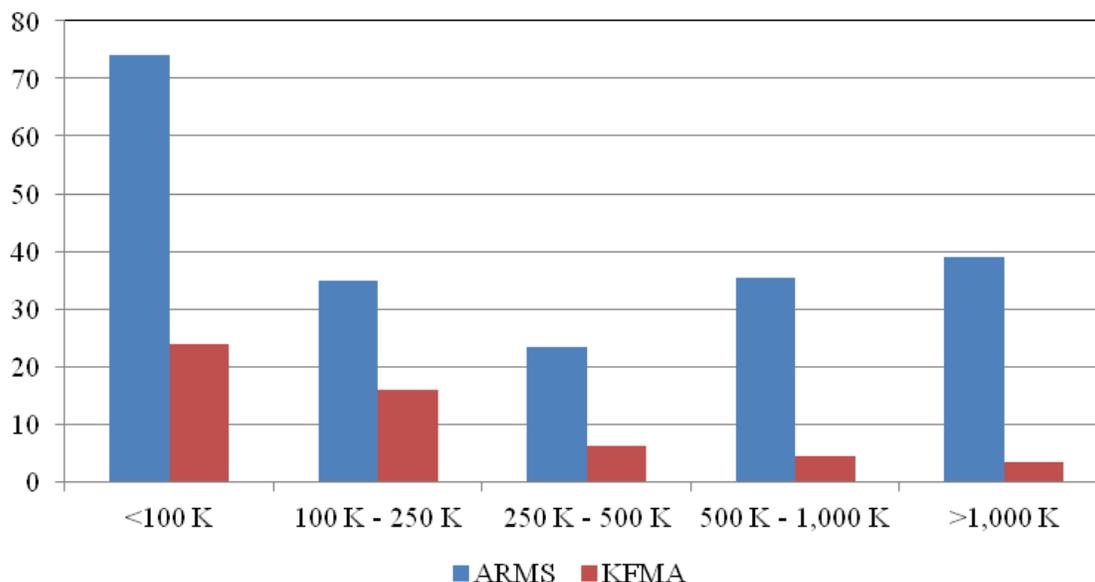
To further investigate whether there is a systematic difference between the KFMA farms and the ARMS farms, the percentage of farms without debt were compared for the ARMS farms and the KFMA farms in Kansas (Figure 12). There is a substantially higher percentage of farms without debt captured in the ARMS sample than in the KFMA sample. When adjusting for this difference, the debt to asset ratios are more comparable but the KFMA farms have a slightly higher debt to asset ratio. Whether this is a systematic difference between the methods used to collect debt in the KFMA process with the ARMS process is not fully resolved. Knuth (2012) indicated that the financial position of Farm Credit Services of America borrowers had an average debt to asset ratio of 34 percent to 35 percent from 2009 to 2011. The average leverage ratio for farm businesses in Nebraska for 2010 was 10.2 percent with the highest average being 18.2 percent for farms with over $1 million in sales (USDA ERS, 2012). The average leverage ratios for farm businesses in Iowa was 10.3 percent with the highest average being 17.3 percent for farms over $1 million in sales (USDA ERS, 2012). However, a study by Micheels and Ellinger in Illinois found that the level of farm assets are not statistically different from ARMS farms but the level of debt was significantly less on ARMS farms for Illinois.

Precursors to a Debt Crisis and Boom-Bust Cycle

The section will consider precursors to a debt crisis or conversely actions to take to avoid a debt crisis. In addition, this section will discuss differences that exist in the current situation compared to those that were in place at the beginning of the previous boom-bust cycle. The previous boom-bust cycle began with a dramatic fall in the ability to repay debt (CDRC falling from 152.8 percent to 16.3 percent from 1979 to 1981 on KFMA farms caused by a decrease in net farm income through a falling value of farm production (15.7 percent on KFMA farms from 1979 to 1981) and increasing interest payments (65.3 percent increase from 1979 to 1981 on KFMA farms). The decrease in the value of farm production and the increase in interest rates made it apparent that the agricultural land values at that time could no longer be supported (Featherstone and Baker, 1987). Falling land values combined with the increased debt and increased interest rates exacerbated the bust phase.

Given the 2010 Capital Debt Repayment Capacity of 134.6 percent are there factors that could cause this factor to drop precipitously? An increase in interest rates and a decrease in the value of farm production can lead to a change in the ability to repay debt leading to an increase debt to asset ratio and ultimately to falling land values. However, it can be argued that the agricultural economy may be better insulated from those issues than in the late 1970s due to the use of fixed interest rate debt and crop insurance that may provide a revenue floor[3].

From 1979 to 1981, interest payments increased by 65.3 percent for Kansas farms. It is important to understand that the debt to asset ratio for KFMA farms in 2010 (26.9%) is similar to that in 1979 (25.0%). The average debt outstanding for KFMA farms at the end of 2010 was $152,697 in short term debt and other current liabilities, $108,750 in intermediate debt, and $153,473 in long-term debt. The average interest payment $20,356 resulted in an average rate of 5.1 percent[4]. However, there are some marked differences between the structure of lending in 2010 and 1979 due to the use of fixed rate products.

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[3] It should be noted that the revenue floor is a short-term floor and not a long-term floor depending on the market price of commodities when the insurance contract is set.
[4] This rate was calculated taking the interest paid by the average debt during the year.

Table 3 provided a breakdown in Farm Credit System debt securities outstanding from year-end 2006 through May 31, 2012. The amount of total Farm Credit debt at par value financed by fixed rate bonds has remained about 50 percent since the end of 2006. According to Davis (2012), as of May 2012, the percentage of farm real estate volume financed by fixed interest rate products fund 83.3 percent of Farm Credit Services of America's real estate portfolio. The situation is different for non-real estate bank loans where 71.3 percent of loans have a floating interest rate (Agricultural Finance Databook). For KFMA farms with debt, Brewer found that banks held an average of 54.2 percent of KFMA debt and that the Farm Credit System held 31.0 percent of KFMA debt. Using the information above, a rough measure indicates that 48.6 percent of KFMA farm debt was financed by fixed rates at the end of 2010. Thus, roughly 50 percent of farm debt in Kansas is susceptible to variable interest rates. Therefore, an increase in interest rate would only affect 50 percent of the debt load immediately. However, the debt load could begin to shift if farmers have difficulty in making scheduled repayments over time.

Table 3: Fixed Rate Farm Credit System Debt Securities Outstanding, December 2006 through May 2012

	Fixed Rate Non-Callable Bonds	Fixed Rate Callable Bonds	Total Outstanding	Percent Fixed
	------------------------ $ billion -------------------------			
12/31/2006	32.4	37.7	134.1	52.3%
12/31/2007	36.6	42.8	154.1	51.5%
12/31/2008	43.0	43.8	176.3	49.2%
12/31/2009	41.7	39.9	176.1	46.3%
12/31/2010	40.9	45.8	187.5	46.2%
12/31/2011	44.0	46.4	183.5	49.3%
5/31/2012	46.0	50.3	187.6	51.3%

Source: Federal Farm Credit Funding Corporation

The second aspect that could decrease the capital debt repayment capacity either alone or in conjunction with an increase in interest payments is a drop in crop revenue. The value of farm production decreased from 1979 through 1981 by 15.7 percent on KFMA farms. To obtain a 15.7 percent drop in the value of farm production, crop

revenue would need to fall by an estimated 21.4 percent on the average KFMA farm[5].
Using Enterprise Data from the 2010 crop year, the average Kansas price received for
non-irrigated corn, wheat, and soybeans was $4.44, $5.04, and $11.45 per bushel,
respectively (Langemeier and Herbel, 2012). To obtain a 21.4 percent decrease in crop
revenue, crop prices received by Kansas farmers would need to fall to roughly $3.49,
$3.96, and $9.00 for corn, wheat and soybeans, respectively. Some have argued that
current revenue insurance products offer a potential floor on the crop income side.
However, it is important to understand that these products only protect revenue within the
season. For example, Kansas wheat prices for revenue insurance purposes are set based
on the August 15 to September 14 price for the July futures contract, and corn in set
based on the February average of the December futures contract. Thus if prices fall, the
amount of revenue protected using crop insurance will also fall. Is there a floor from the
target price system in the previous Farm Bill?[6] The 2010 to 2012 target prices are $4.17
for wheat, $2.63 for corn and $6.00 for soybeans (USDA ERS, 2012). Thus, prices could
fall by 21.4 percent or more before program payments begin to offset the loss of revenue.

Table 4: Sensitivity of 2010 Average KFMA Farms to 1979 to 1981 Decreases in Revenue and Increases in Interest Payments

	2010	65.3% Interest Increase	15.7% Crop Revenue Decrease	Both	Both w/o Government Payments
Value of Farm Production	534,070	534,070	450,293	450,293	426,583
Government Payments	23,710	23,710	23,710	23,710	0
Livestock Income	119,375	119,375	119,375	119,375	119,375
Crop Income	390,985	390,985	307,208	307,208	307,208
Expenses w/o Interest	356,932	356,932	356,932	356,932	356,932
Interest	20,356	33,649	20,356	33,649	33,649
Total Expenses	377,289	390,582	377,289	390,582	390,582
Net Farm Income	156,782	143,489	73,004	59,712	36,001
Capital Debt Repayment Capacity	154.20%	139.60%	62.20%	47.60%	21.57%

Table 4 illustrates the potential impact of a decrease in crop revenues and/or an
increase in interest payments similar to those that occurred from 1979 to 1981. The

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[5] The fall in crop revenue must be higher than the value of farm production due to livestock revenue and government payments.
[6] It is unclear at this point what the new Farm Bill will have in the final version for target prices, if any.

second column illustrates the situation at the end of 2010 for the average Kansas farm. The Capital Debt Repayment Capacity calculated from the average dollar amounts is 154.2 percent, which differs from the average stated above of 134.6 percent that is calculated from the average of the Capital Debt Repayment capacity across farms. Column three illustrates an increase of 65.3 percent in interest payments. This would cause the capital debt repayment capacity to fall to 139.6 percent. Column four illustrates a 15.7 percent decrease in the value of farm production caused by decreasing crop revenue. This results in a fall in the Capital Debt Repayment Capacity to 62.2 percent. The fifth column represents a combination of interest payment increases of 65.3 percent and a decline in the value of farm production of 15.7 percent, resulting in a fall in the Capital Debt Repayment Capacity to 47.6 percent. The final combination is the result of the both scenarios with the added elimination of $23,710 of direct farm payments; resulting in a 21.6 percent Capital Debt Repayment Capacity measure. Thus, a repeat of the situation that occurred from 1979 to 1981 could result in a substantial reduction in the repayment capacity of KFMA farms. It should be noted that there will be a distribution around these estimates with a number of KFMA farmers in a more precarious situation.

Featherstone and Baker (1987) found that the last two agricultural land boom-bust cycles were driven by different factors. The most recent one (1970s to 1980s) was more driven by income factors. The previous one (1920s and 1930s) was driven by interest rates. Schurle et al. (2012) recently estimated a model of land prices for Kansas and Illinois. They found that nominal cash rent and the real (inflation-adjusted) interest rate were important drivers of land values since 1967 with increases in cash rents increasing land values and increases in real interest rates decreasing agricultural land values. Table 5 reports the regression estimates from Schurle et al. Using these estimates, the elasticity for a percentage change in land values due to a percentage change in cash rents is much greater than a percentage change in real interest rates using 2010 values. The elasticity for a change in cash rents is 1.31 in Kansas and 1.15 in Illinois. The elasticity for a change in interest rates is -0.04 in Kansas and -0.06 in Illinois. Thus, a substantial increase in the real interest rate would need to occur for land values to be affected substantially. While a number of agricultural land mortgages are made at a fixed rate, the expectations model for land indicates that the adjustment in land values will

occur from an increase in interest rates, although the cash flow affect will be mitigated until any fixed rate mortgages are retired. A more likely scenario for falling land values would occur from a drop in income generating potential causing cash rents to decrease leading to a fall in land values.

Table 5. Nominal Land Price Forecast Model for Kansas and Illinois (1967 – 2010)

Variable	Estimate	Standard Error	t Statistic
		Kansas Model	
Intercept	-242.19	66.82	-3.62**
Nominal Cash Rent	28.30	1.69	16.74**
Inflation Rate	-239.82	568.11	-0.42
Real Interest Rate	-1702.26	572.42	-2.97**
R-Squared	0.94		
Standard Error	85.16		
		Illinois Model	
Intercept	-345.93	238.75	-1.45
Nominal Cash Rent	29.77	1.60	18.61**
Inflation Rate	-2164.75	2332.65	-0.93
Real Interest Rate	-11150.84	2311.40	-4.82**
R-Squared	0.95		
Standard Error	347.37		

** - Significant at the 5% level of significance
Source: Schurle et al. (2012)

A decrease in income from the land or an increase in interest rates both would exert negative pressure on land values. Macroeconomic theory would suggest that an increase in real interest rates would tend to decrease income in markets that are dependent on exports. The regression model estimated by Schurle et al. (2012) indicates that for 2010, the land value is 14.4 percent and 6.2 percent above that predicted by the model; possibly indicating some additional market speculation or a potential bubble. According to Knuth (2012), buyers of Iowa agricultural land are between 73 percent and 82 percent farmers from 2008 through 2011. Thus, a fall in land values would primarily be felt by farmers and their lenders.

Concluding Thoughts

The agricultural sector is coming off several years of record income. However, the farmland, which makes up a substantial portion of a farmer's balance sheet, is

susceptible to boom-bust cycles. Is the agricultural sector setting itself up for another bust? Is this boom different? This paper examined one of the conditions for a bust, namely the leverage condition of the cycle. The following conclusions are drawn from this paper:

1)   The average loan to value ratio for a portfolio of defaulted mortgages from the last boom-bust cycle was 60 percent. Currently, lenders are lending up to 65 percent of loan to value.

2)   The average loan performance on defaulted loans from the last boom bust cycle was 5.6 years. Thus, there is a lag of years before loans default. Examining the historical underwriting conditions of one's portfolio is important in addition to considering current underwriting standards.

3)   The average real cost of borrowing on those defaulted mortgages discussed above in the last bust was 2.41% which is lower than the current average real cost of borrowing of 4.71%.

4)   Most buyers of farmland are other farmers and the average is not what will drive any bust, but the tails (margin). The average is affected to what happens in the tails (margin).

5)   At the end of 2010, an estimate of the average probability of default is slightly higher than it was in 1979 for a set of Kansas farms.

6)   The debt to asset ratio is **higher** for a set of Kansas farms in 2010 compared to those in 1979. In addition, there are a higher percentage of Kansas farms with more than 40 percent debt to assets and 70 percent debt to assets in 2010 compared to 1979.

7)   A significant drop over two years in the ability to repay debt lead to the financial crisis and the drop in land values in the 1980s. Similar percentage changes in the value of farm production and interest payments coupled with an elimination of direct farm payments can result in a similar drop in repayment capacity.

8)   Revenue insurance or farm programs will likely not cushion that size of drop across years.

9)   The use of fixed rate loan products will mitigate some of the cash flow issues but would not affect nor prevent a fall in farmland values.

10)   Revenue drops will more likely lead to a fall in land prices than an increase in interest rates but they tend to occur together.

The farm sector is currently in excellent shape from a leverage and credit perspective. Will leverage drive another bust cycle? Leverage will likely not be the cause of a bust cycle but it certainly can exacerbate the falling of land values if farmland values begin to fall.

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Who Leveraged the Farm?

Edward Cooper

Senior Vice President, Wells Fargo Bank

Thank you. It's a pleasure to be here to be part of the symposium. It was a great day yesterday afternoon, and I am looking forward to more of the same.

As mentioned, I represent Wells Fargo Bank and my remarks will be focused on the commercial side of the business versus the production and producers' side. I am going to discuss general trends we see, many that are very similar to some of the trends that have been already discussed. I will also talk about some of the credit accumulation trends we see and point out a couple of the risks that we find in our markets.

With respect to general trends, we think there has been a shift in the last 10 years in the volatility of the markets. Clearly, the corn price has moved a lot in the last few years in terms of volatility. Looking at the average daily corn price distribution at the Board of Trade from 2002-2007 versus 2007-2011, that distribution has been expanded by 35 percent. The tails on the 2007-2011 distribution are a little bit longer than the tails on the prior. Both types of volatility changes (greater price movements and a wider range of prices) have material impacts on the price of the commodity and on businesses that managing their commodity exposure. Whether they are in the animal-feeding business or the merchandizing business, the increased volatility has repercussions on their ability to maintain their risk management policies/positions.

Bill [Hudson] and Brent [Gloy] yesterday talked about the shift from supply driven events to demand-driven events. This fundamental demand-driven shift, whether it be from ethanol energy demand or middle class Asian-diet demand, has replaced the supply shock of short production levels. When you put both of them together, price volatility can be exacerbated, as we are seeing today.

Another trend is uncertain regulatory environments. It can be government or special-interest groups that create this uncertainty. We have production clients who are managing their coal emissions. Standards for handling emissions haven't been totally agreed upon, so while there is a need to make meaningful capital expenses, they are waiting for certainty on the regulation prior to moving forward. Uncertainty also exists in

animal production companies. Whether it is cage sizes in the poultry business or gestation facility standards for sow operators in the pork industry, the reinvestment of meaningful long-term capital is being delayed until standards are understood. Companies require certainty that their investments will meet standards and not need to be redone. The development of standards is not necessarily legislated solely by government agencies but also by pressure from special interest groups who feel that long existing production standards are not appropriate for the current environment.

Changes in historical relationships that have been tried and true have also been recently altered. Markets typically follow annual patterns. During the last couple of years, some of our clients have seen a shift in that pattern and it has affected their profitability. Valuation levels just haven't been as predictable in the past. Local prices vis-à-vis the exchange prices haven't acted the way they have historically.

We also see greater use of partnering. Firms are looking at the risks and determining that certain investments are best done through joint ventures. They are also establishing LLCs as a way to limit the exposure to certain enterprises.

Finally, I'll mention a general trend that there has been an increase in outside investors. We do see more foreign companies come into the market, more private equity-type firms being interested in the market, and a little bit of talk of some Wall Street folks becoming involved. Agriculture is being viewed as a long-term fundamentally strong place to invest. We see a little more of that activity coming into the general commercial agribusiness market.

Shifting over to some of the debt accumulation trends, maybe debt accumulation isn't the right phrase. Commercial firms aren't as leveraged today as compared to 2007 when the last run up in prices occurred. Balance sheets have gotten better. Some of the data we look at – RMA data for wholesale merchandisers – indicates that liquidity positions have increased in the last 10 years. We are at a 10-year high for liquidity, as measured by total working capital vis-à-vis total assets. With respect to leverage, the same data indicates a 10-year low of long-term debt to total assets. Firms have adjusted their financial position in the last 10 years. Most of this is due in part to retention of healthy earnings, also possibly some postponement of capital projects. Overall, balance sheets are in pretty good shape.

Second, I'll mention there is an increased credit capacity among the clients we're seeing. One of the measures we look at is credit facility size to working capital. Most of the lending we do to merchandisers is borrowing-based driven and working capital is the key. Working capital levels help dictate how much credit clients can absorb. If one looks at credit facility size to working capital as a ratio, prior to 2007 among our client base that number was about 2.75. If you had $10 million in working capital, the credit line typically would have been $27.5 million.

Leading up to the 2007-2008 price run-up, that ratio spiked up to six times. That's a pretty full level. We typically view six to seven times working capital as an appropriate size of lines. Clients were fully leveraged vis-à-vis their working capital ability to margin credit facilities, in our opinion. That six times is an aggregate measure, so there are many stronger capitalized companies that were below and many who were above that. Even when the corn prices were moving, the commercial banking sector did a nice job with this group of customers in bringing them through that high grain price bubble.

Since 2008, that ratio has backed down below six times to the 3.75 to 4 range and despite this current run up in prices, it remains at that level today. The other thing to note is there has been improved credit facility management. Companies are maintaining larger credit lines than they have in the past. Nobody is real thrilled with having to come back to their financial institution on a monthly basis or sometimes weekly basis asking for more money. This time they are retaining their liquidity, they have been retaining their capital and retaining their credit size in an effort to be prepared for the next run up.

With respect to risk management trends, I would say companies are also looking for alternative risk management procedures. Obviously, exchanges are a great way to manage risk, but they are looking for off-exchange solutions, as well. They have looked to derivatives or partnering with firms to take out some of the market volatility.

Finally, I'll talk about a couple of risks. The first is forgetting the cycles. It's not a matter of if, but when supply will exceed demand. Whether it happens during this fundamental shift we talked about (the demand driven from energy or Asian diets) or a few years hence, markets will find equilibrium. Prices will probably subside from these high levels, and what will the industry look like when prices fall? Those believing markets will remain this tight should proceed with caution.

Counterparty risk is something that has to be measured. Can we identify and measure of counterparty risk? How well do you do that? That is something we are constantly looking at with our client base. The firms who do it well are very disciplined. When they have to-arrive contracts, they understand their client base, they are looking at their farmer's base acres, they understand what that farmer could deliver, and they are doing all the blocking and tackling so when they make a purchase commitment they feel confident the farmer will be able to deliver against those commitments.

Second, it is not enough to do that analysis up front only. Once when one makes a contract there needs to be a constant mark-to-market-type analysis. Markets movements change initial commitment values and the exposure levels as well.

Another point to mention – and Secretary Yeutter mentioned it yesterday – is managing internal company risk. As we talk with our owners and managers, we discuss how well are they managing, not only the counter-party and open-position risk, but their ability and understanding of their internal risk controls within their own firms. How well are they doing that is something we continue to evaluate.

Finally, the impact in these historical relationships has an impact on their cash flow needs. The fertilizer markets have been discussed a little yesterday. Obviously, there has been a shift in cash flows associated with ordering. The manufacturers continue to provide forward product for customers at a specific price but they are no longer willing to do that based upon a contract alone. If you want to have a certainty of supply at a certain price, you're going to put up a deposit. So the manufacturers are requiring the wholesalers to put up a deposit. The wholesalers are requiring the retailers in many cases to put up a deposit. The question is, are the retailers requiring the producers to put up the deposit? With the volatility in the fertilizer prices, that is a risk we've seen increase. Managing this risk at the retail level will take a little more education than in the past.

An example for this education process can be seen through a situation in our markets where a consultant that was advising producers to buy fertilizer in December in the $700 ton range and then simultaneously market their corn. Around 60 days later, the fertilizer price dropped a couple hundred dollars a ton in this specific market, creating the appearance of a better buying opportunity. However, producers who purchased inputs in December at the higher price and marketed corn made more profit than producers who

bought their inputs 60 days later at a lower cost. This occurred because the corn price had dropped to a lower level than the decline in inputs. It's going to take an education effort in the industry to start talking to producers about risk management and taking some of those tails off the cash flow distribution.

Thank you.

Who Leveraged the Farm? (Transcript)

Donald Reynolds

Chairman and CEO, Regional Missouri Bank

The 1980s were a lot tougher for me than going through the trauma of putting everything I had on the line to buy a then-troubled bank. Incidentally, one of the things that has me a little distracted yesterday and today, as some of you may be aware, is Missouri's oldest charter bank failed last Friday. Our bank bought it, so I've had some distractions in that respect. My telephone is on silent, but I can feel it vibrating. [laughter]

A little with my history, the first 20 years of banking, I worked primarily for holding company banks in small communities, but primarily in the agriculture area – first for the Commerce organization and then Mercantile, which years ago was Missouri's largest banking institution. It has since been merged into a larger institution and no longer is a Missouri corporation.

In that first 10 years, in the1970s, you almost could not screw up bad enough to make a bad farm loan. Inflation and the Farmers Home Administration would take out anything you could do. I look around and there are a lot of people in this room that don't remember the 1980s. I'm the only elder person in our bank. We have eight people who make ag loans. The rest of them are all in their early 40s or younger. I hope they do not have to go through what I did during the 1980s. Fortunately, we were able to keep a bank intact, but it was tough.

I can remember in 1977, I became president of Mercantile's bank in Salisbury, Missouri, which is a small community of less than 2,000 people. The American Bankers Association at that time published – and maybe they still do – a list of the top ag banks in the country. Well, the Salisbury Mercantile Bank got to be the 17th largest ag bank in the United States, which I took great pride in that for awhile. [laughter]

In the 1980s, that wasn't so much fun. But there for a little while being recognized as being that big a part of the ag lending community in this country and the fact that we were recognized as being one of if not the top earning bank in the Mercantile

system, so all was good. I would submit some of the income and cash flow shocks that Dr. Featherstone just put up on a system are much worse on some individual borrowers than his averages would indicate. It went from good income to massive losses on an individual basis.

I can remember one evening we spent hours and hours of trying to figure out how to save this farm operation or, if we couldn't, how best to get out. One evening about 7 p.m. my wife had called me to ask, "Can't you get home?"

She insisted that I have supper with the kids, so I hurried home. There was an elderly man that was a little slow in that respect in town. Lewis always ran around humming to himself. It didn't seem like there was much there. I got behind Lewis in the car and he was tooling up Broadway at 5 to 10 mph, I couldn't get around him, and I was grumbling to myself … and it hit me, "Lewis isn't uptight, and you are!"

People, there was a lot in that period of time that was tougher for me than what we're seeing today. It was tough in some respects to be with a bunch of people on Friday night to close out a bank. It's an ag bank, but prior ownership elected to invest heavily in commercial real estate that didn't work. It really wasn't anything that the local community or the employees did wrong, but it was still tough to see people lose their bank.

Going forward, we think we have more sophisticated cash flow analysis, a spreadsheet you can shock easily, but to go through some of the shocks that we saw between 1979 and 1983, I'm not sure I'm convinced we are fully prepared to go through that. Hopefully, we don't have to. We're all in a position where we have a great deal of push to get that money back out earning something greater than zero. My seat-of-the-pants analysis – and we're a small bank, we don't have the big analysis that Wells Fargo or the Federal Reserve has – but it certainly looks to me that a number of us are stretching some to make some loans now. Hopefully, we know more about what we are doing. Thank you.

Who Leveraged the Farm?

Daryl Oldvader

President and CEO, FCS Financial

Good Morning! My name is Daryl Oldvader and I am CEO of FCS Financial – one of 83 associations nationwide that comprises the Farm Credit System. I have had the privilege of being a part of agricultural lending for the past 40 years. Needless to say, there have been a few changes – not only in the industry we serve, but also in the manner in which we monitor financial health.

In aggregate terms, the farm balance sheet has always been relatively healthy. Since 1970, the annual average Debt-to-Asset ratio was a very strong 15 percent. It is important to note, however, the increasing bi-modal distribution of agriculture producers does impact the average Debt-to-Asset, or leverage position. Consider a 2009 USDA study (*Amber Waves, December 2009*) that showed at the end of 2007, 50 percent of farm business debt was held by 15 percent of farmers. This compares to 30 percent of farm business debt held by farmers in the mid-1980s. So, we have support for the notion that a transition is occurring in agriculture where the large farmers are getting larger, and the balance sheets for the segment viewed as traditional farmers are becoming smaller in proportion to the Total Farm Debt.

We have seen this transition play out in our loan portfolio at FCS Financial. From 2005 to 2011, the average Debt-to-Asset ratio for the overall FCS Financial borrower reduced from 41 percent to 38 percent, reflecting a decrease in leverage. Generally, while commercial-sized farm operations do in fact have higher leverage ratios than smaller traditional-sized farm operations, the level of leverage decrease during the last six years is more pronounced for the larger producers than for the smaller farm operations. This characteristic of decreased leverage for the growing, commercial farming operations is at first thought to be counter intuitive. However, considering the significant impact of escalating land values in recent years and the record net income levels for agriculture, it makes sense that the efficient, large-scale crop operations have been able to acquire farmland to grow their business with less leverage. They generally have had healthier balance sheets and stronger income statements than their traditional-sized counterparts.

In the FCS Financial portfolio, the larger scale farm operations (loans >$1 million) have seen their leverage reduce by an average of –7 percent compared to –4 percent for smaller traditional-sized farm operations.

FCS Financial Debt/Asset		
	2005	**2011**
Total Portfolio	41%	38%
Traditional farms (<$1mil)	39%	35%
Commercial farms (>$1mil)	48%	41%

Farm Debt Leverage Trend:

As I have referenced, the average farm balance sheet in aggregate has been healthy through the last 50 years of history. There is, however, notable movement in the trend-line that reflects the debt escalation that occurred in agriculture through the late-1970s and into the mid-1980s. The Debt/Asset peak of 22.2 percent occurred during the farm crisis in 1985. Since that time, this ratio has generally trended lower to its current historical level of 10.5 percent.

A leverage characteristic that has long been applied to agriculture is that a significant population of farmers has no debt. The aforementioned USDA study showed 65 percent of farmers reported having no debt on their farm business balance sheet. The report also showed these self-financed, debt-free farms as typically being on the smaller end of the scale in terms of land operated (averaging 258 acres). This is relevant to FCS Financial in that Missouri is a small-farm state having the second largest number of total farms in the United States.

Not all debt-free farms are small. The USDA study showed over 14 percent of farmers with annual sales between $1 million and $5 million reported owing no debt at the end of 2007. Nevertheless, on average, farms that reported outstanding debt were larger in terms of both assets and sales than farms that operated debt-free.

Debt/Asset						
1980	**1985**	**1990**	**1995**	**2000**	**2005**	**2011**
16.2%	22.2%	15.6%	14.8%	13.6%	11.0%	10.5%

Farm Debt Relative to Farm Enterprise:

The state of Missouri has a balanced mix of crop and livestock farming operations. To the extent that the FCS Financial loan portfolio provides a reasonable representation of the state, our portfolio comparisons indicate that crop operations have less leverage and have had a higher degree of de-leveraging success in recent years as compared to their livestock counterparts. Two contributing factors for the higher rate of crop farm de-leveraging include a higher relative level of profitability in recent years (especially 2008/2009) for crop producers and the fact that cropland valuations have increased at significantly higher rates than livestock facilities. Additionally, there are some areas in the state where pastureland values have even declined.

FCS Financial Debt/Asset		
	2005	**2011**
Total Portfolio	41%	38%
Crop operations	37%	34%
Livestock operations	43%	42%

Farm Debt Relative to Farm Income:

A review of farm income levels – gross farm and net farm – during the period of years leading up to the farm crisis of the 1980s compared to the recent decade illustrates the impact of farm debt relative to income.

In the 12-year period from 1975 through 1986, there was not a single year that gross farm income exceeded 110 percent of total farm debt – a factor considered today in our repayment capacity analysis. Conversely, from 1988 through 2011, there was only one year (2002) that gross farm income did **not** exceed 130 percent of total farm debt while in15 of those 24 years, it exceeded 140 percent.

So, it is readily apparent that increased farm income levels (Gross and Net) relative to total farm debt have contributed to maintaining the decreasing leverage (Debt/Asset %) trend line of farm balance sheets since 1985.

(Here is an example of comparative income to debt measures for two notably different 12-year periods of agriculture operations.)

	Gross Cash Income/ Total Farm Debt	Net Farm Income/ Total Farm Debt
1975 thru 1986, avg.	90%	16%
2000 thru 2011, avg.	142%	34%

Impact of Interest Rates on Farm Debt/Income:

Another material consideration as to the impact of leverage on a farm operation is the cost of debt – interest rates – in relative terms to income. The early 1980s included several years when interest rates were at double-digit levels. Compare this to recent years where we have experienced consecutive years of a historically low interest rate environment. Using a 9 percent average interest rate for the late 1970s and early 1980s time period, the average interest paid as a percent of farm gross farm income would have been over 10 percent. More recently, farmers could find 5 percent money to finance their debt. The aggregate interest expense on the total farm debt for this latter period would on average amount to only 4 percent of gross farm income … a considerable savings.

Learning from History:

The adage of "*learning from history or be bound to repeat it*" is one that has been seriously considered by those in agriculture who lived through the 1980s. FCS Financial, specifically, and Farm Credit in general have a very seasoned work force that has not forgotten the lessons learned during that decade. The American farmer today has an average age of 58, meaning many of them experienced first-hand the adverse impact of excessive leverage. A study by Dr. Freddie Barnard, et al, entitled *Financial Stages of a Farmer's Life,* notes the de-leveraging that occurs over the lifetime of the average farmer – farmers under the age of 30 have debt/asset ratios almost three times higher than those in the 60-plus age group. The transition we have seen in farm leveraging within our own loan portfolio over the past 25 years is consistent with the findings of this study.

From both a borrower and lender perspective today, using more cash and equity to expand a farm balance sheet has generally replaced the mentality of the 1980s to maximize leverage since *"they are not making any more land."*

Summary:

The opening question for this session was "Who Leveraged the Farm?" In reality, the data indicates the average farm balance sheet has the lowest level of debt/asset leverage of the past 40 years. Income-to-debt ratios for agriculture, whether gross or net, are at their highest levels of the past 40 years. Interest expense, a direct by-product of debt and leverage, as a percent of net income is at its lowest level for that same period of time.

We have seen during the past 5 years – and continue to experience today, substantial economic volatility. The same holds true for agriculture commodity prices. Each of the afore-referenced factors contributing to the favorable metrics for agriculture producers can and may well change over the next few years. Asset values (i.e., crop land values) may reverse trend and go down. Income levels may also reverse trend. Interest rates, only because they seemingly can go no lower, are certain at some point to go up.

Whatever negative events occur to reverse the positive trends of recent years in agriculture, the average American farm balance sheet is in as healthy a position as it has been in for more than a generation. In aggregate, the financial statement of the average American farm is as reasonably positioned as it could be to weather a storm that should be reasonably expected.

Resources:
http://www.ers.usda.gov/data/FarmBalanceSheet/
http://www.ers.usda.gov/data/FarmIncome/finfidmu.htm
http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1194.
http://portal.asfmra.org/userfiles/file/journal/261_Barnard_1.pdf

Who Leveraged the Farm? (Transcript)

Moderator, Alison Felix

Assistant Vice President and Denver Branch Executive

Federal Reserve Bank of Kansas City

Alison Felix: So thanks to all of our panelists. At this time, we have a little time for a few questions. So, if you have a question, please step up to the microphone. I think we have a question right here.

Jim Andrew, Andrew Farms: First of all, I challenge the other people in this room to ask questions. [laughter] They're going to think I'm a hired stiff that came down from Iowa.

One of things I've always wondered about, who monitors the private credit situation, such as John Deere Farm Plan, IH, Caterpillar, the herbicide companies, seed corn companies? Who keeps a tab on that? Do we have any knowledge of what's going on there, as far as the amount of financing there being arranged through dealers?

Allen Featherstone: In terms of the sector – and this can be an issue – what I would say is that ultimately the markets discipline. John Deere, Case-New Holland, and certainly through share price and things like that, it's the monitoring. Certainly they don't have a regulator, other than the market, which ultimately is the regulator.

In terms of their revenue information, one of the categories of credit we end up looking at, that we are able to pull out, is we are able to pull out loans with vendor finance. The share, at least in Kansas, has been increasing over time. Off the top of my head, roughly 10 percent of the loans in Kansas are some type of vendor-financed loans. At least in Kansas, that would be the share.

However, the average loan size per loan is smaller. If you look at it in terms of a dollar of the portfolio, it's still probably about 5 percent or 6 percent at least looking at the Farm Management data, with regard to the loans they have.

Jim Liggett, First Bank of Utica: Jim Liggett, Utica, Nebraska. My question is directed to Allen. You comment a lot about the supplier, the farmers, the debt levels, and

so on from the late-1970s and early-1980s. Do you have a comment on the quality of capitalization from the lenders' side during that same time period as you look at things then?

Allen Featherstone: I guess I have studied a lot with regard to capitalization on the lenders' side in terms of whether balance sheets are stronger or not. In some respects, these two guys might have a better idea, since they lived through the 1970s in terms of what they think about the capitalization of their institution.

Don Reynolds: I don't think there is a massive difference. Yes, I'm afraid we are pressed to keep a little higher level of capital than we used to. The examiners probably watch the level of the loan loss reserve maybe a little more. There is better sophistication in risk management. That's where you pay attention. It does help some. As far as an overall level of capitalization, today we target and sing to it that we have 11 percent or thereabouts of risk-based assets and, in a lot of respects, there is a disincentive to keep more.

Daryl Oldvader: Certainly, the Farm Credit System if go back they now pay the crisis of 1985 and now is come up _____ as comparison. The entities are more locally owned and controlled but all their capital is there. Our capital levels are much higher. In our particular situation, we're 18 percent on permanent capital. As we look at what has also transpired the consolidation system, we have an insurance corporation we didn't have prior to 1985. There are a lot of changes. This is why a lot of lenders would be better prepared, given the economic change in agriculture. Financially, their balance sheets are better.

Alison Felix: Other questions? Let me think of a question real quick, but think of your question and come up to the microphone.

I have a question for Dr. Featherstone. You talked about several financial ratios in your outlook. Which one of those would you say is best in predicting bankruptcies? What do you think it is and why?

Allen Featherstone: In terms of the study I did, I looked at three main ratios. One was a working capital ratio, one was the capital debt repayment capacity, and the other one was essentially a leverage ratio. In terms of predicting farm bankruptcy, the one – if it begins to move a little bit – has a big effect on the probability of bankruptcy is the

leverage ratio. Second would be the working capital ratio, and the third would be the capital repayment debt capacity. The capital debt repayment capacity bounces around a lot more than either the working capital or the leverage ratio, but the leverage ratio is more elastic in terms of farm bankruptcy than the other two, with the working capital being in the middle.

Alison Felix:

Great, thank you. Any other questions? Please join me in thanking our panel for their time. [applause]