

Credit Scores of Kansas Farms

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Background

- Financial health of the farm sector has been excellent the last couple of years
- However, the overall economy is
 - beginning to experience a slow down
 - a credit crunch
 - and record high energy prices

Background

- Will the farm sector be affected by the high energy prices and a slowdown in the economy?
- The last major adjustment occurred in the 1980s
- Will we see a similar adjustment in the 2010s?

Background

- The current financial situation from a banker's perspective on Kansas farms is the best ever?
 - True
 - False

Background

- The current financial situation is the best since _____ ?

Objectives

- Examine Credit Quality of Kansas Farms using Two Models
 - Risk Rating System used in Western Kansas
 - Probability of Default Model
- Examine Changes over Time
- Consider the Future

Applying Credit Scoring Models to Kansas

- Calculated the ratios necessary to rate farms
- Kansas Farm Management Data from 1973 to 2007
- 1200 to 2000 observations per year
- Synthetically rated each Kansas farm

Western Kansas Risk Rating System

- Categorizes three ratios from 4 to 9 and uses a rounded weighted average of those ratios
- Owner's Equity
 - 45%
- Current Ratio
 - 35%
- Capital Debt Repayment Capacity Coverage
 - 20%

Owner's Equity

Measure of a farm's solvency, (ending net worth)/(ending assets)

4	>80%
5	75-80%
6	65-75%
7	55-65%
8	45-55%
9	<45%

Current Ratio

Measure of a farm's liquidity, (current assets)/(current liabilities)

4	>2.5
5	2.1-2.5
6	1.7-2.1
7	1.4-1.7
8	1.2-1.4
9	<1.2

Capital Debt Repayment Capacity

Measure of farm's ability to pay long-term debt,
(farm & off-farm income – taxes - living current assets- principal)
(intermediate & long-term principal and Interest)

4	>175%
5	160-175%
6	145-160%
7	125-145%
8	110-125%
9	<110%

What do the risk rating categories mean?

4	Borrowers of Excellent Quality, BBB+ to BBB
5	Borrowers of Strong Quality, BBB to BBB-
6	Borrowers of Good Quality, BB+
7	Borrowers of Average Quality, BB+ to BB
8	Borrowers of Adequate Quality, BB to BB-
9	Borrowers of Minimally Acceptable Quality, BB- to B+

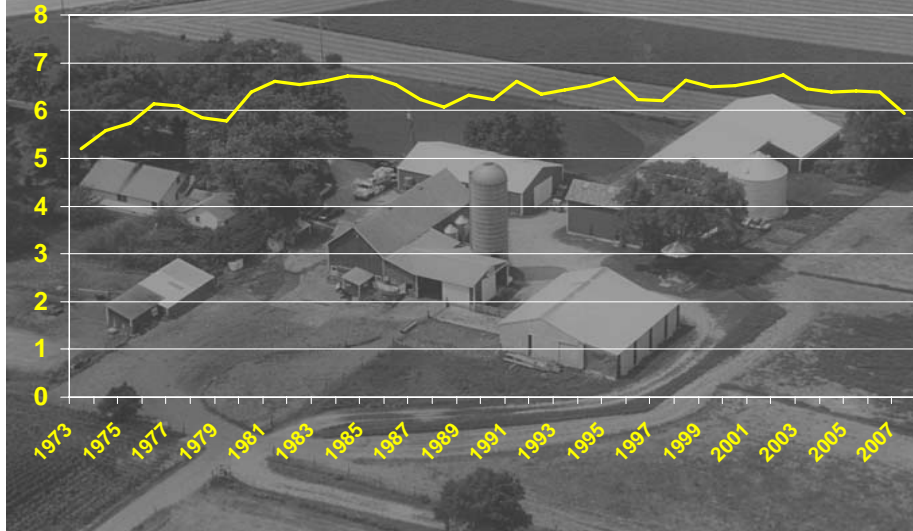
What does it imply for borrowing cost?

Rating	1 yr	2 yr	3 yr	5 yr	7 yr	10 yr	30 yr
Aaa/AAA	14	16	27	40	56	68	90
Aa1/AA+	22	30	31	48	64	77	99
Aa2/AA	24	37	39	54	67	80	103
Aa3/AA-	25	39	40	58	71	81	109
A1/A+	43	48	52	65	79	93	117
A2/A	46	51	54	67	81	95	121
A3/A-	50	54	57	72	84	98	124
Baa1/BBB+	62	72	80	92	121	141	170
Baa2/BBB	65	80	88	97	128	151	177
Baa3/BBB-	72	85	90	102	134	159	183
Ba1/BB+	185	195	205	215	235	255	275
Ba2/BB	195	205	215	225	245	265	285
Ba3/BB-	205	215	225	235	255	275	295
B1/B+	265	275	285	315	355	395	445
B2/B	275	285	295	325	365	405	455
B3/B-	285	295	305	335	375	415	465
Caa/CCC+	450	460	470	495	505	515	545

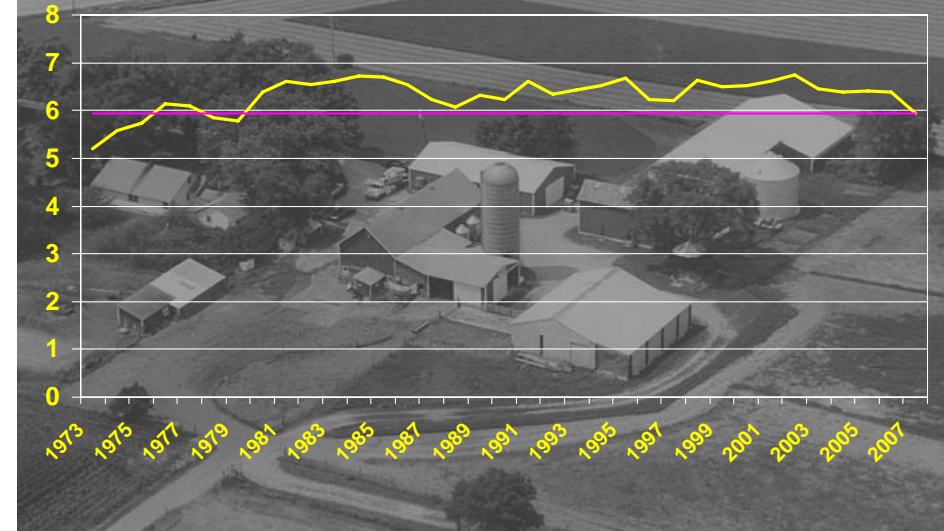
What does the S&P rating mean?

AAA	Exxon
AA	Nestle
A	McDonalds, ADM
BBB	Federal Express, Safeway
BB+	Amazon
BB	Direct TV, Land O'Lakes
BB-	Del Monte, Dean Foods
B+	VeraSun Energy, Denny's
B	Dollar General, Delta
B-	GM, American Airlines

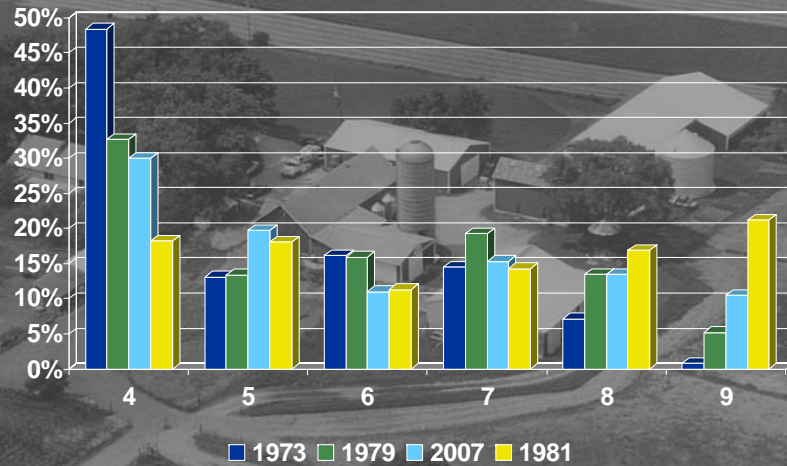
Average Risk Rating of Kansas Farms



Average Risk Rating of Kansas Farms



Variability of Ratings in Various Years



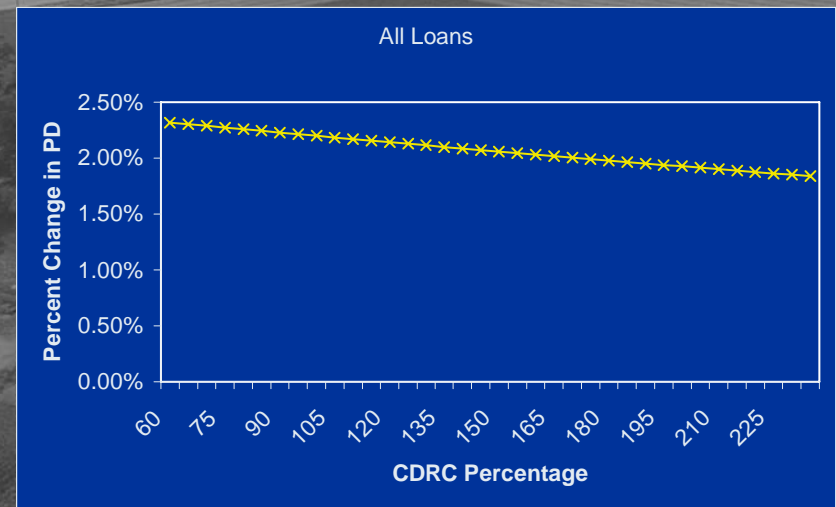
Probability Model of Default

- **Seventh Farm Credit District Loan Level Data**
- **11 State Geographic Region**
- **“Snapshots” of Portfolio at Year Ends 1995-2002**
- **Loan Origination Data (157,853 loans)**

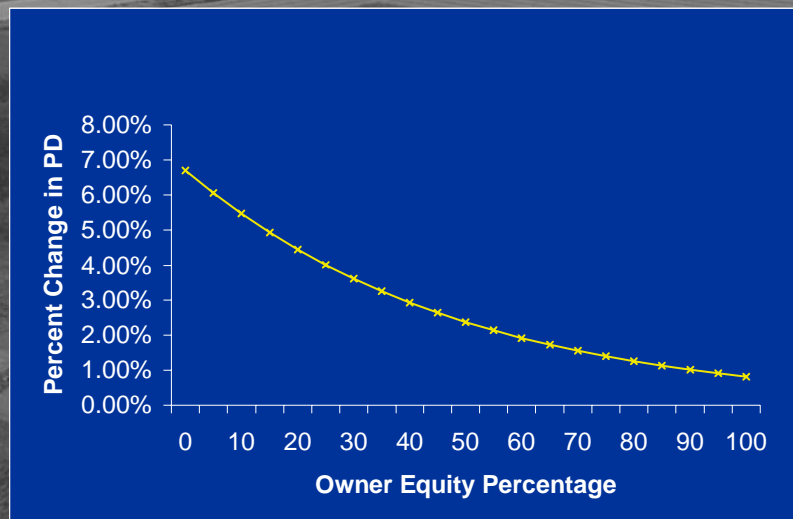
Probability Model of Credit Quality

- **Dependent Variable – *Default***
- **Independent Variables – *Repayment Capacity, Owner Equity, and Working Capital Percentages***
- **$xb = -2.3643 - 0.00135 * cdrc - 0.0217 * oep - 0.00399 * wcp$**
- **$prob = (exp(xb)) / (1 + (exp(xb))) * 100$**

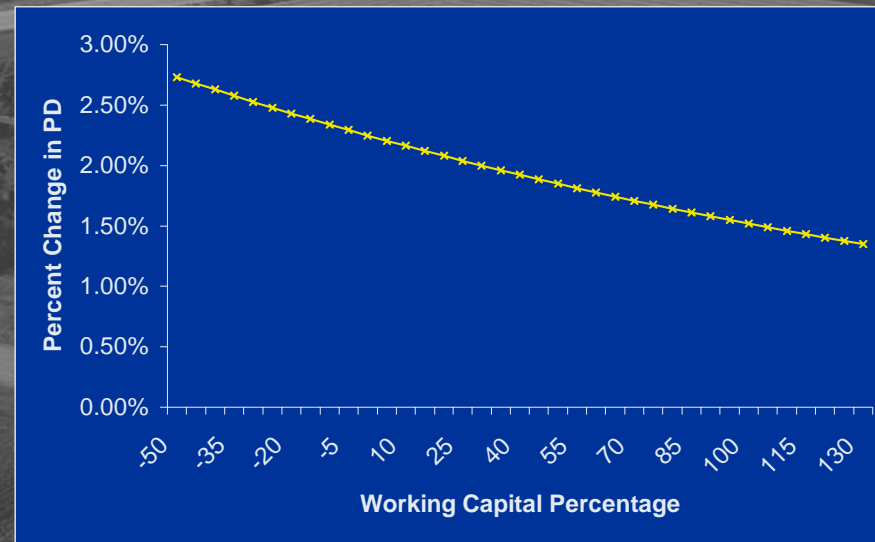
Change in PD as CDRC Increases



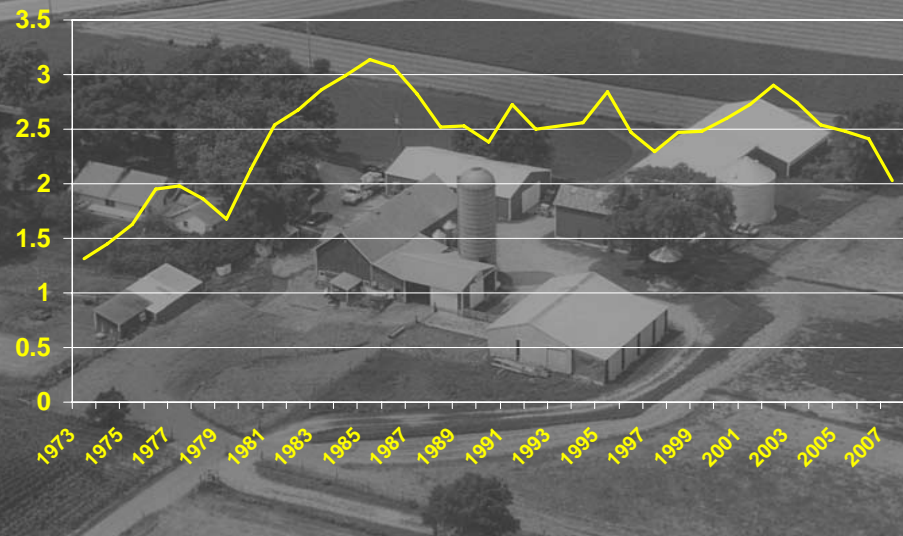
Change in PD as Owner Equity Increases



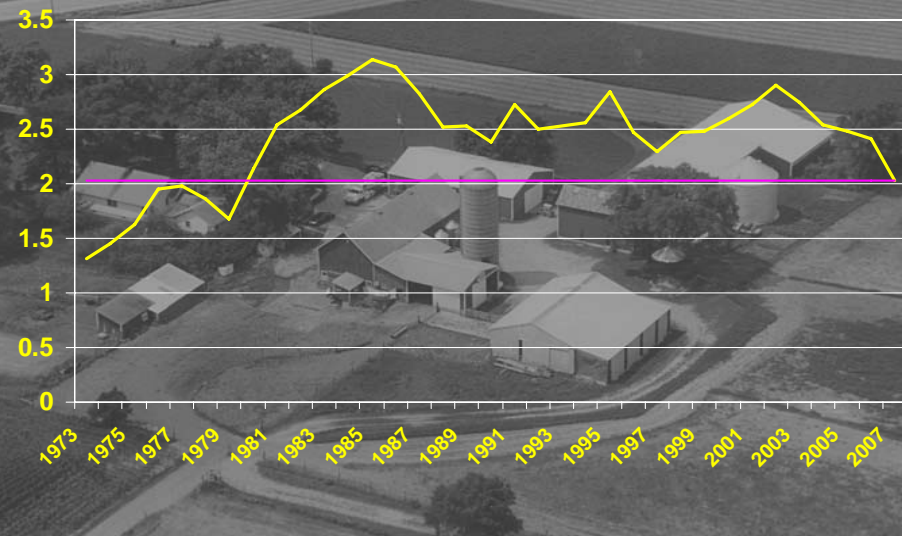
Change in PD as Working Capital Increases



Probability of Default for Kansas Farms



Probability of Default for Kansas Farms



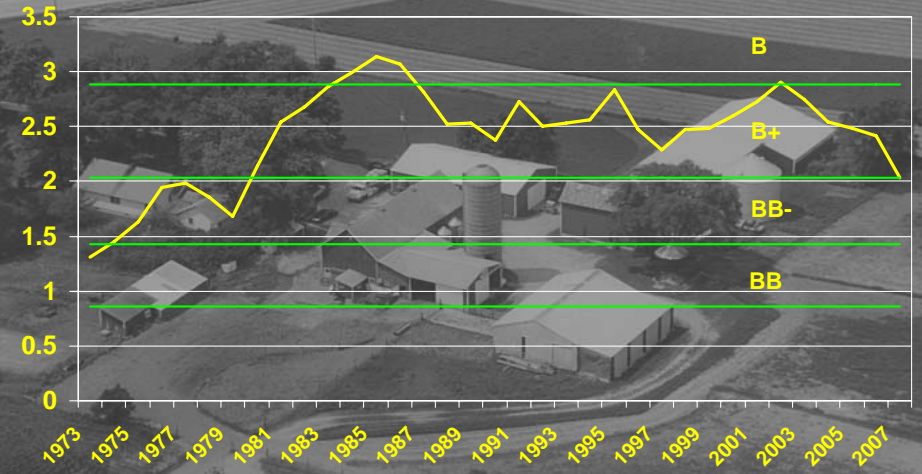
Credit Quality Mappings

Table 1. The Mapping of S&P Credit Ratings to KMV EDF Values

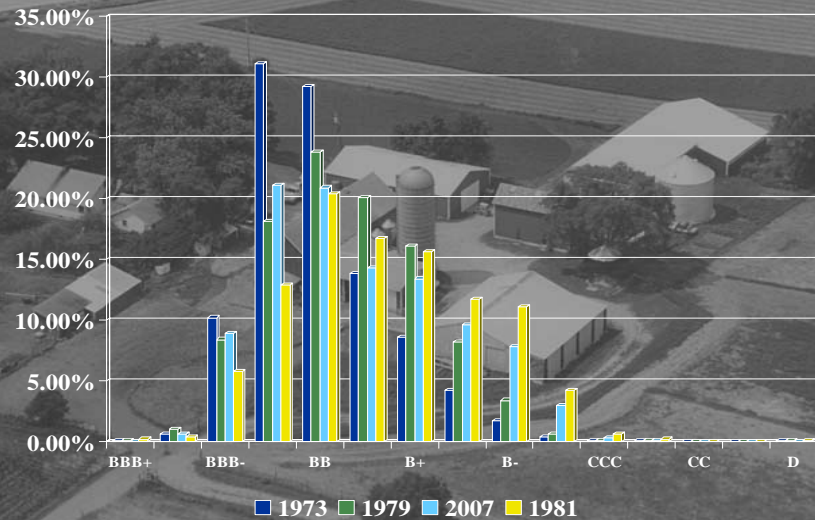
S & P Rating	KMV EDF Value (%)
AAA	(0.00, 0.02)
AA+	(0.02, 0.03)
AA	(0.03, 0.04)
AA-	(0.04, 0.05)
A+	(0.05, 0.07)
A	(0.07, 0.09)
A-	(0.09, 0.14)
BBB+	(0.14, 0.21)
BBB	(0.21, 0.31)
BBB-	(0.31, 0.52)
BB+	(0.52, 0.86)
BB	(0.86, 1.43)
BB-	(1.43, 2.03)
B+	(2.03, 2.88)
B	(2.88, 4.09)
B-	(4.09, 6.94)
CCC+	(6.94, 11.78)
CCC	(11.78, 14.00)
CCC-	(14.00, 16.70)
CC	(16.70, 17.00)
C	(17.00, 18.25)
D	(18.25, 20.00)

Source: Lopez 2001

Probability of Default for Kansas Farms



Distribution of Credit Quality



Comparison of Two Rating Systems



Comparison of Two Rating Systems

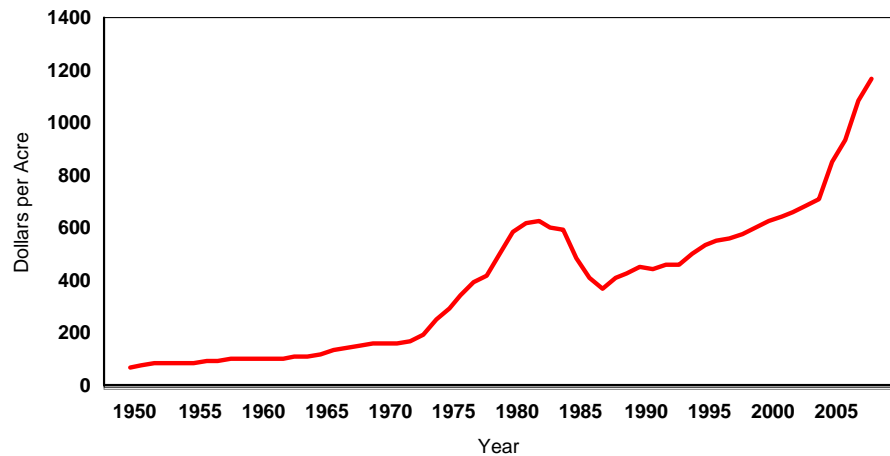
- The correlation between the two rating systems is 0.90
- The risk rating system does not change as much as the probability model
- The correlation of changes from year to year is 0.84

The Future

- Previous figures have indicated that moving from a situation that we have now to one like we had in 1981 could occur in a couple of years
- What might cause that to occur?

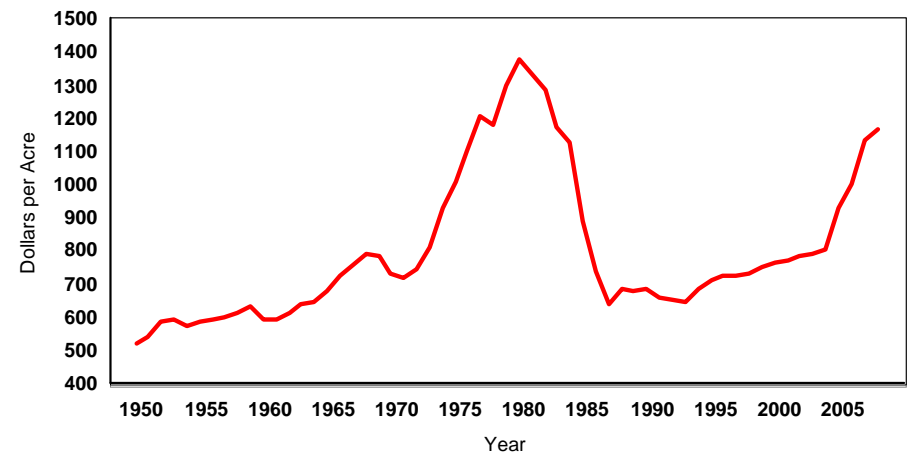
Nominal Land Values

Nominal Kansas Land Prices, 1950-2008



Real Land Values

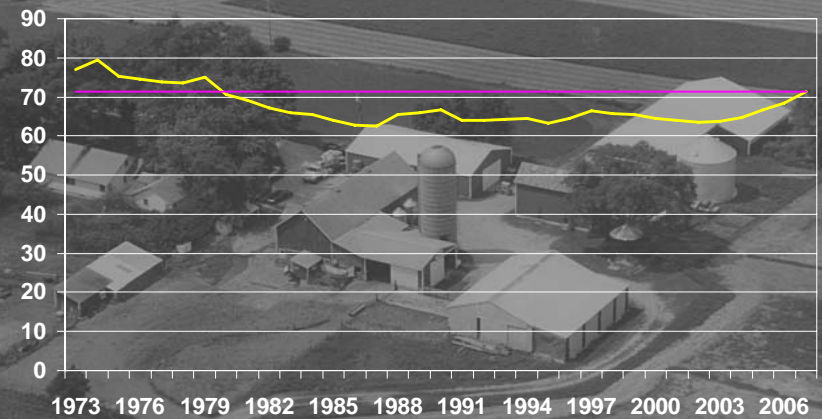
Inflation Adjusted Kansas Land Prices, 1950-2008



Land Values

- Land values make up nearly 70% of the balance sheet
- Land values have increased dramatically in inflation adjusted values
 - Currently 45% more than 2004 level
 - Currently 67% more than where they ended up after the 1980s fall

Equity to Asset Ratio



Implications

- If land values would go back to more normal levels, the owners equity to debt ratio would change from:
 - 2007 Owners Equity 71.32%
 - ???? Owners Equity 60.10%
- This alone would cause the probability of default to change from 2.01% to 2.55%

Implications

- However, this would also likely be accompanied by a decrease in working capital and capital debt repayment capacity ratios
- Caveat
 - Debt relative to assets has declined over the 5 years and very rapidly over the last two
 - Debt relative to assets is higher today than it was from 1973 to 1979

Agricultural Income Forecast

U.S. net farm income

Billion dollars

USDA Farm Income Forecast to 2017



Conclusions

- The current financial situation is not the best of all time.
- The current financial situation is the best since 1979.

Conclusions

- Increases in credit quality are rewarded in the bond market with lower interest rates.
- Movement from a B rating to a BB rating in the corporate market would suggest a decrease in interest rates of 1.40%

Conclusions

- The credit situation can change dramatically in a couple of years
- Land values will be a key component in any possible change
- Land values will be driven by profitability
- Profitability outlook is ???