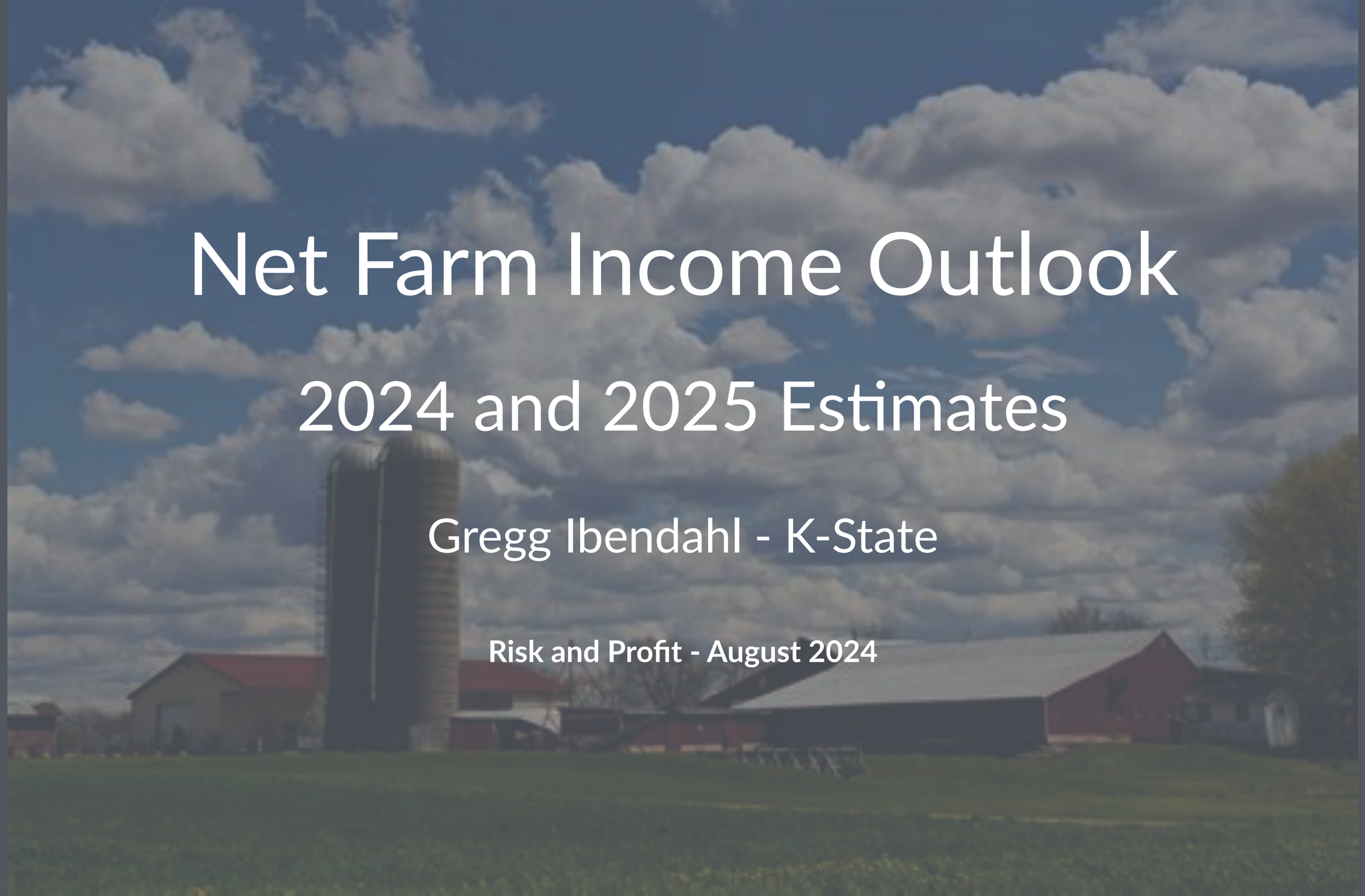


Net Farm Income Outlook

2024 and 2025 Estimates

Gregg Ibendahl - K-State

Risk and Profit - August 2024

Things certainly have changed in a couple of months

Memorial Day forecast

Net Farm Income - state	2022	2023	2024(p)	Est 2025
NFI	$ 203,445	$ 89,667	$ 118,048	$ 114,965
% Change		-56%	32%	-3%

August forecast

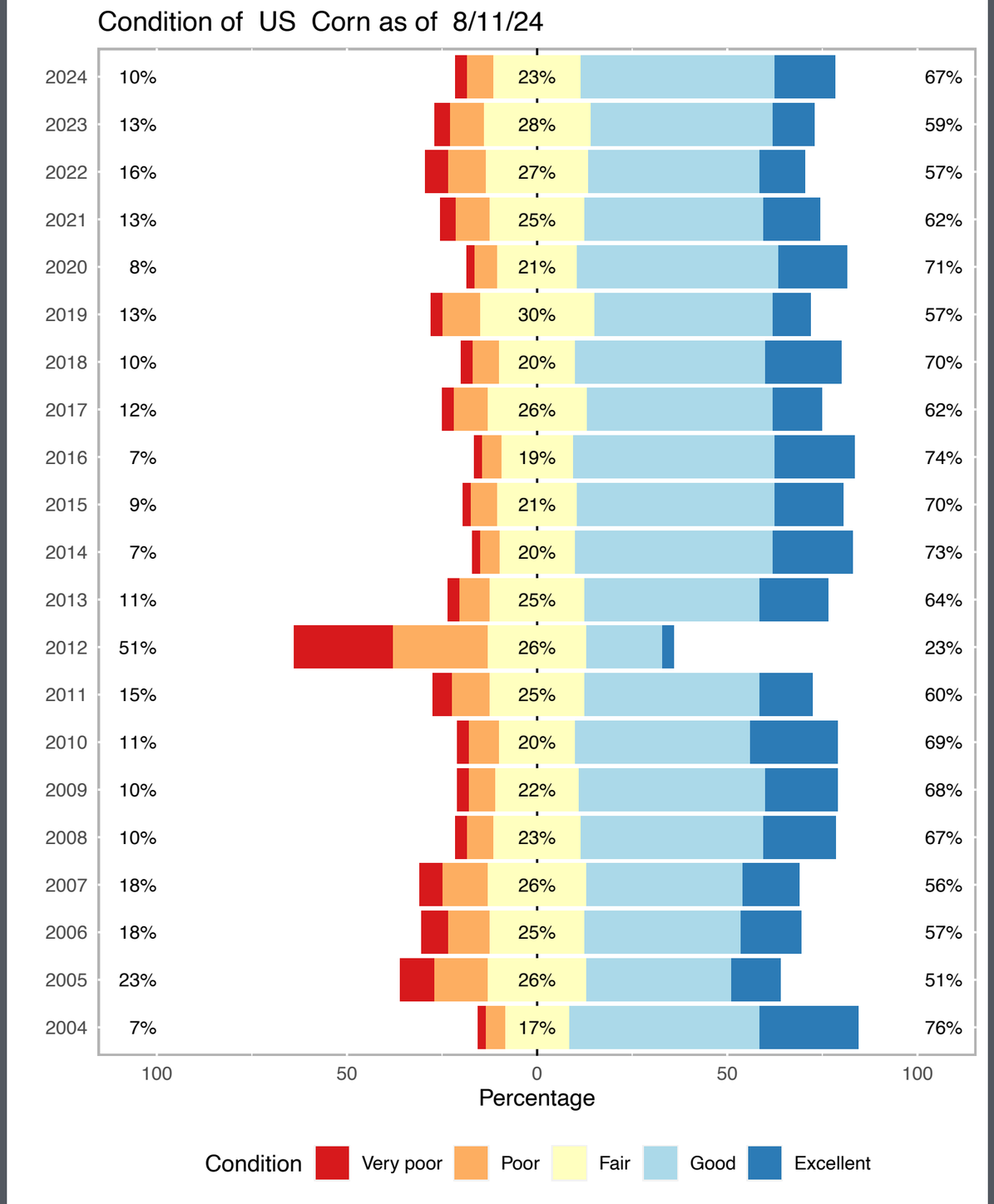
Net Farm Income - state	2022	2023	2024(p)	Est 2025
NFI	$ 203,445	$ 89,667	$ 44,999	$ 73,473
% Change		-56%	-50%	63%

- Some improvement in input costs
- However, overshadowed by decline in grain prices
  - Corn and soybeans look to have record yields

My current estimates

- Based on KFMA grain farms
- Wheat yield estimate from NASS (44 bu/ac)
  - Other summer crop from my estimate (plus NASS)
- Prices based on futures market (August and beyond)

Crop yields



Corn looks really good in the US

- Only 10% in the poor or very poor category
  - Only 5 out of the last 20 years have fewer acres
- 67% in the good and excellent category

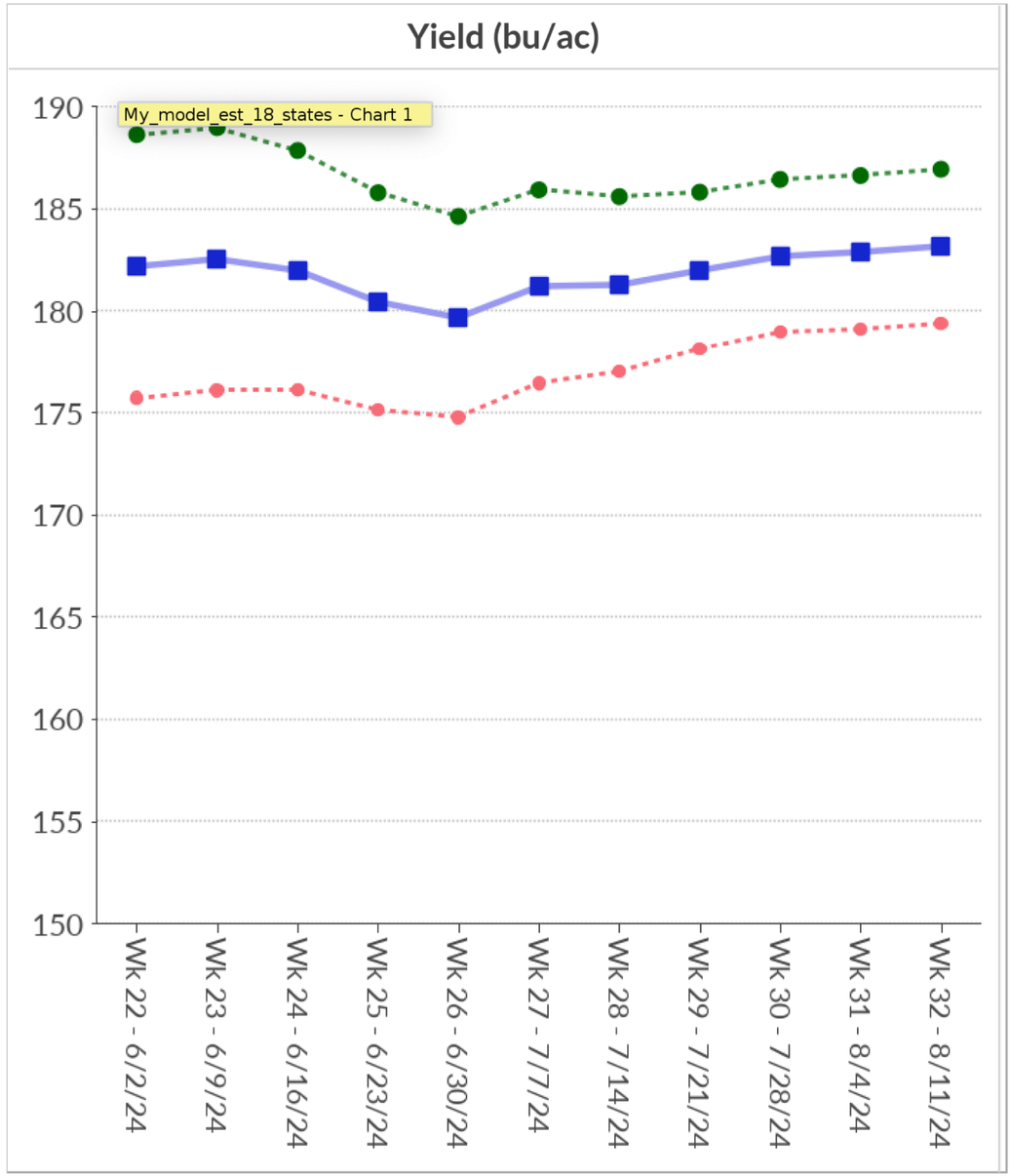
Corn Yields per Acre by State - 8/11/24

Bushels per harvested acre

State	Last year	2024 prediction			
		Lower CI	Predicted	Upper CI	R squared
Colorado	122.0	124.4	128.6	132.9	−0.01
Illinois	206.0	212.9	217.8	222.6	0.65
Indiana	203.0	197.3	201.3	205.3	0.70
Iowa	201.0	205.8	209.7	213.6	0.47
Kansas	119.0	120.3	123.5	126.6	0.66
Kentucky	187.0	175.5	178.8	182.1	0.82
Michigan	168.0	174.1	177.0	180.0	0.52
Minnesota	185.0	187.6	191.3	195.0	0.28
Missouri	153.0	179.5	184.7	190.0	0.80
Nebraska	182.0	192.3	194.6	196.9	0.71
North_Carolina	147.0	80.8	89.2	97.5	0.80
North_Dakota	143.0	138.3	142.7	147.1	0.30
Ohio	198.0	189.5	192.6	195.7	0.77
Pennsylvania	157.0	142.7	146.6	150.5	0.73
South_Dakota	152.0	157.5	161.5	165.5	0.47
Tennessee	173.0	157.6	161.2	164.8	0.83
Texas	122.0	117.7	121.6	125.6	0.55
Wisconsin	176.0	175.2	178.1	181.0	0.49

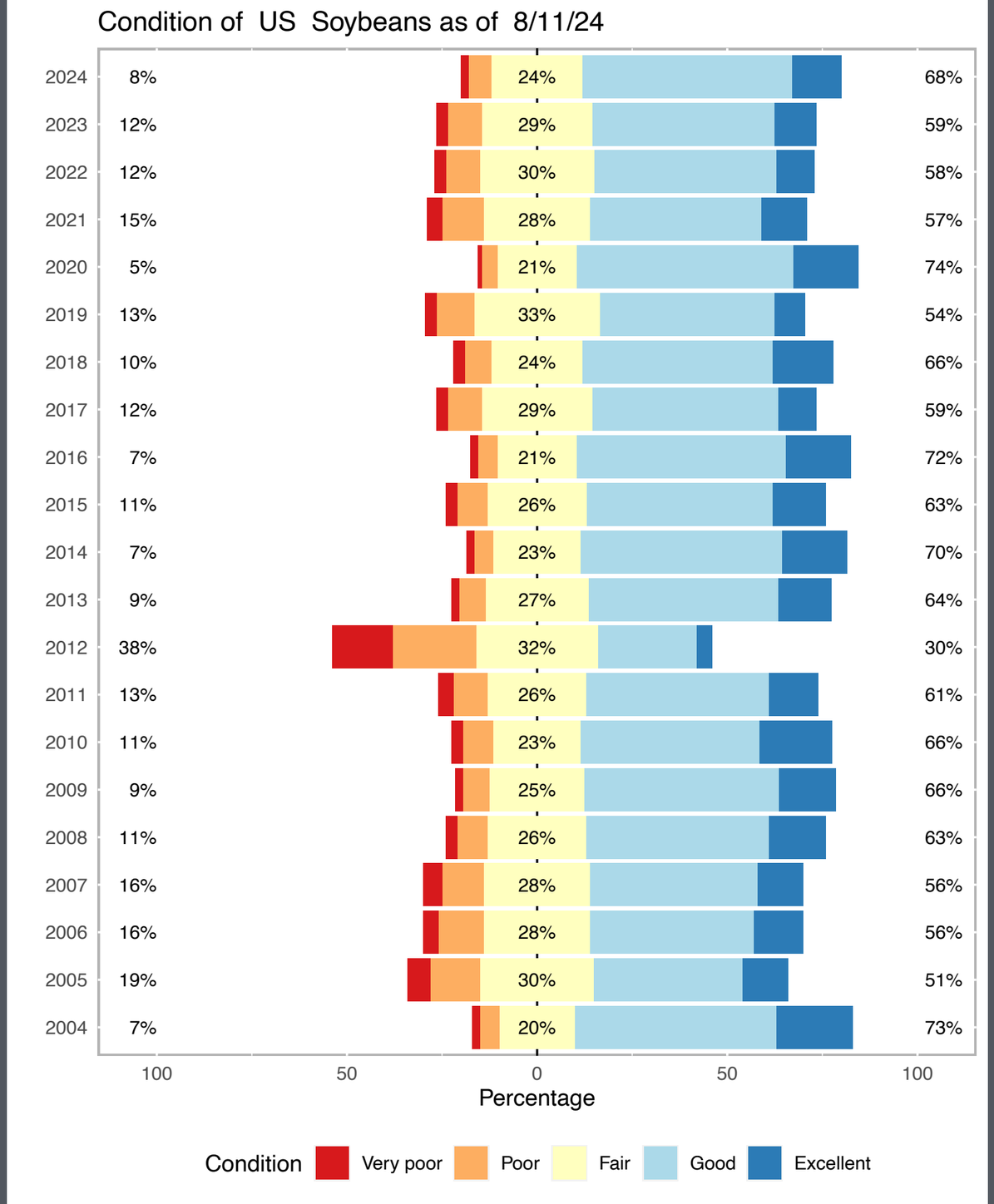
Most states will have very good yields

- NASS predicting 183.1 bu/ac
  - My estimate is almost identical
- I'm predicting 124 bu/ac in Kansas
  - much better than last year
  - NASS at 128



US yields have been improving each week

- Easily a record US yield
- Can trendline yields be believed?
- Crop production report has a 1% decrease in acres
  - total production was neutral (vs expectations)



Soybeans also look really good in the US

- Only 8% in the poor or very poor category
  - Only 4 out of the last 20 years have fewer acres
- 68% in the good and excellent category

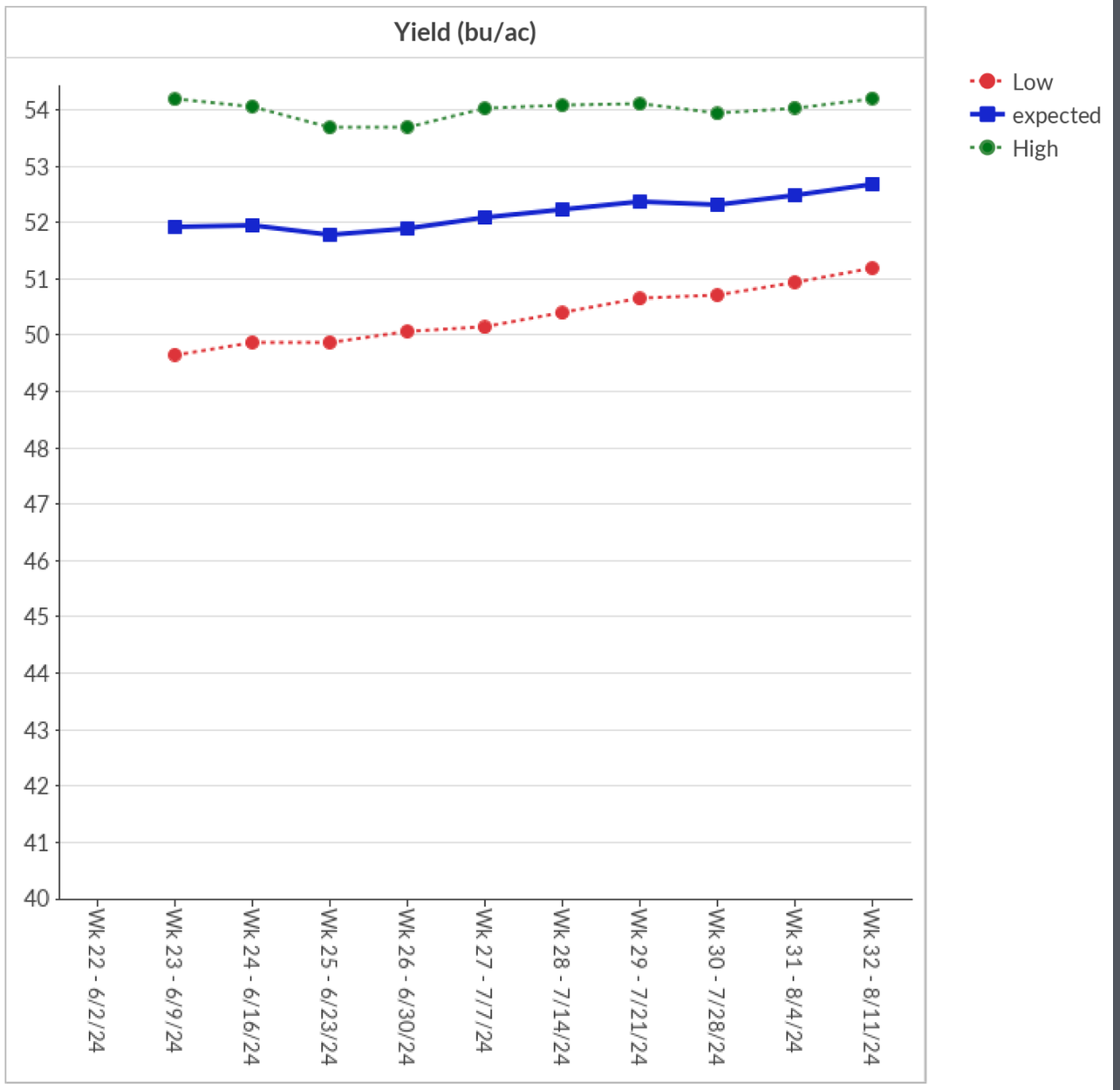
Soybean Yields per Acre by State - 8/11/24

Bushels per harvested acre

State	Last year	2024 prediction			
		Lower CI	Predicted	Upper CI	R squared
Arkansas	54.0	56.0	57.5	59.1	0.41
Illinois	63.0	62.1	63.6	65.1	0.20
Indiana	61.0	59.4	60.7	61.9	0.44
Iowa	58.0	58.0	59.7	61.5	0.15
Kansas	26.0	37.2	39.2	41.3	0.39
Kentucky	55.0	52.3	53.8	55.4	0.45
Louisiana	40.0	55.3	57.5	59.6	0.47
Michigan	46.0	47.6	49.0	50.5	0.06
Minnesota	48.0	47.2	48.6	49.9	0.06
Mississippi	56.0	57.6	58.4	59.3	0.70
Missouri	48.0	50.9	52.7	54.5	0.54
Nebraska	51.5	60.0	61.4	62.7	0.55
North_Carolina	38.5	35.0	36.1	37.2	0.64
North_Dakota	35.5	32.5	34.1	35.6	0.06
Ohio	58.0	56.8	57.9	59.1	0.46
South_Dakota	44.0	43.6	45.1	46.5	0.16
Tennessee	51.0	47.5	48.8	50.2	0.66
Wisconsin	51.0	47.5	49.6	51.7	0.07

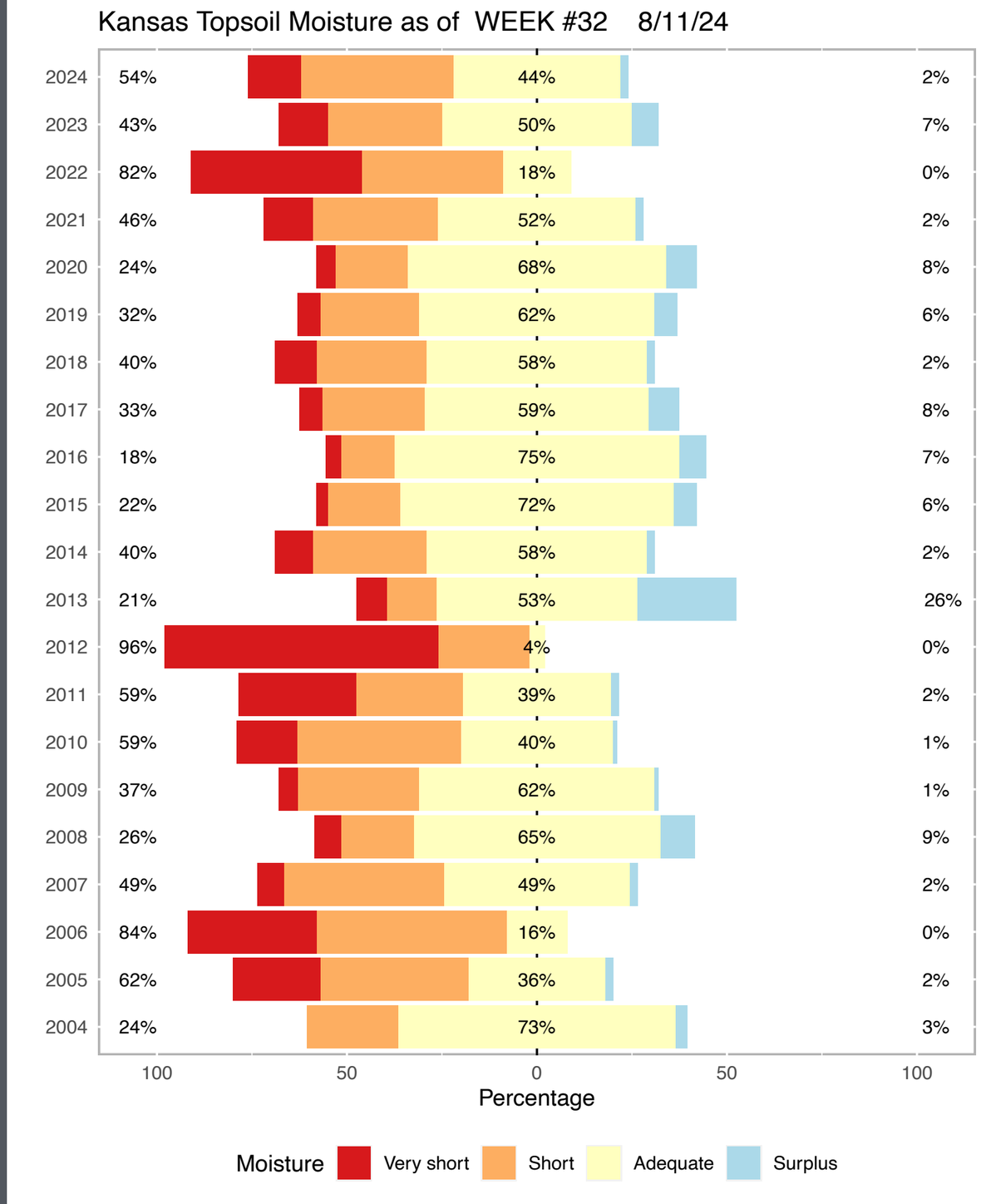
Most states will have very good yields

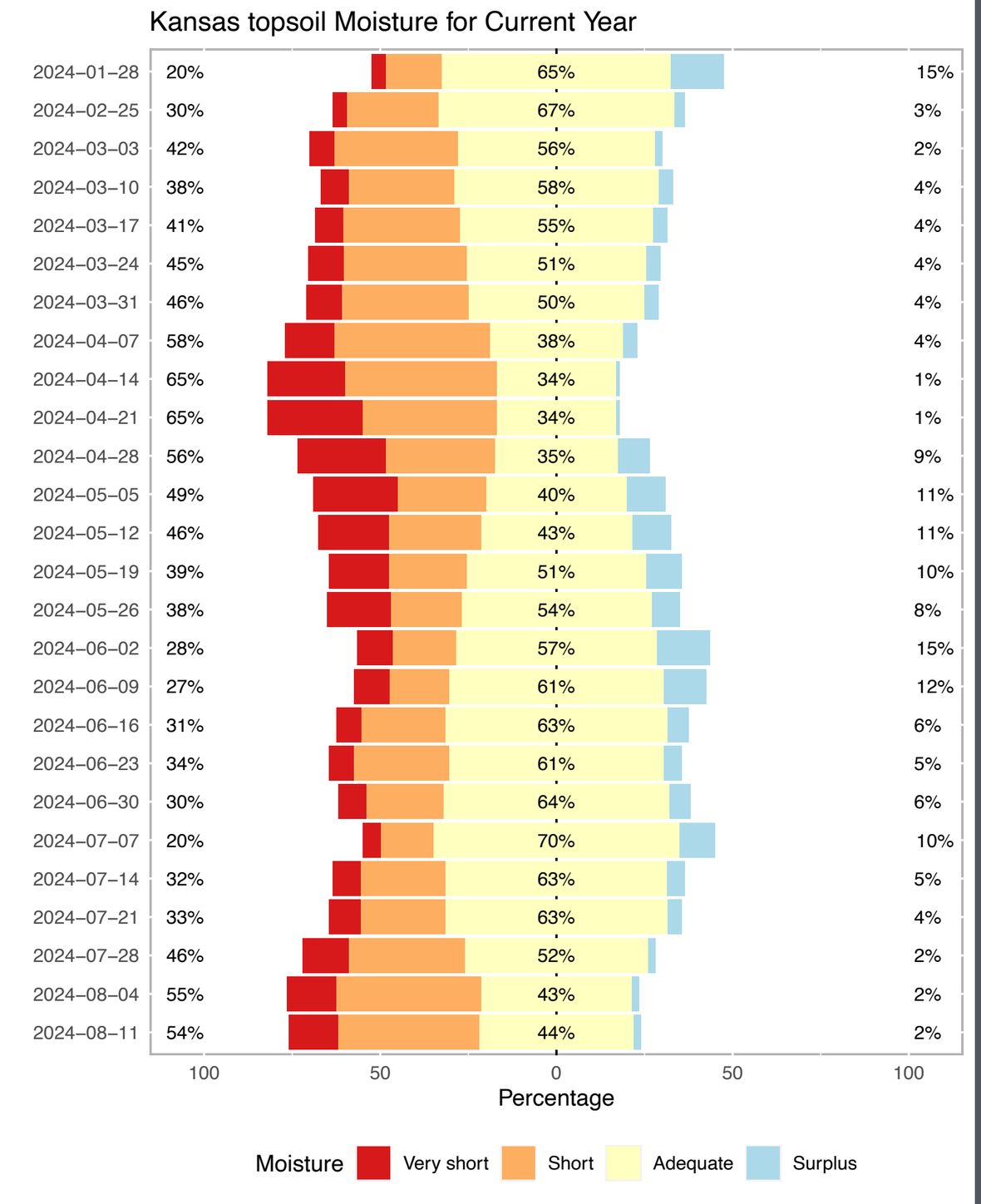
- NASS predicting 53.2 bu/ac
  - My estimate is similar at 52.7
  - Soybeans are much tougher to estimate than corn (lower R sq)
- I'm predicting 39 bu/ac in Kansas
  - 50% better than last year
  - NASS at 38

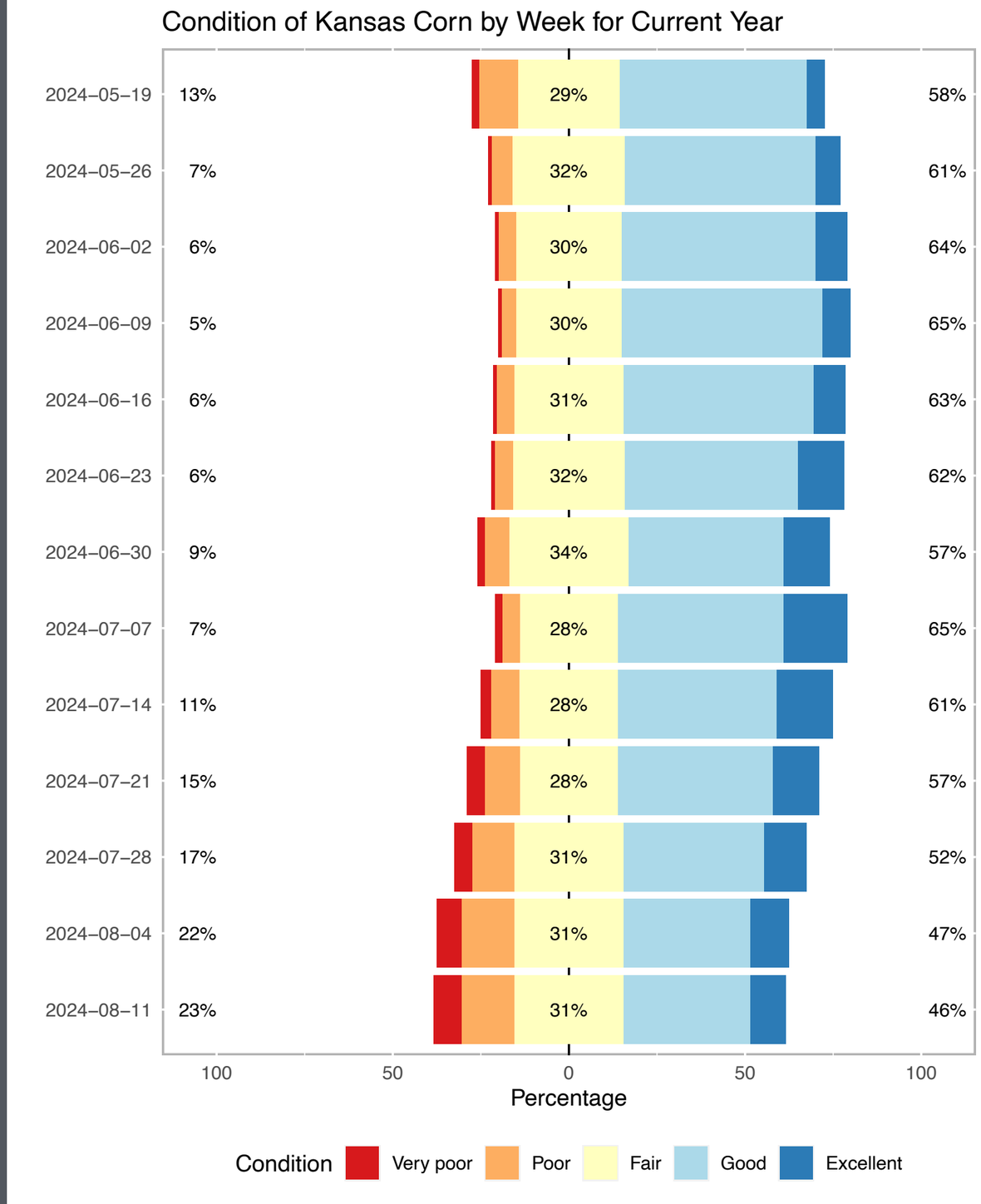


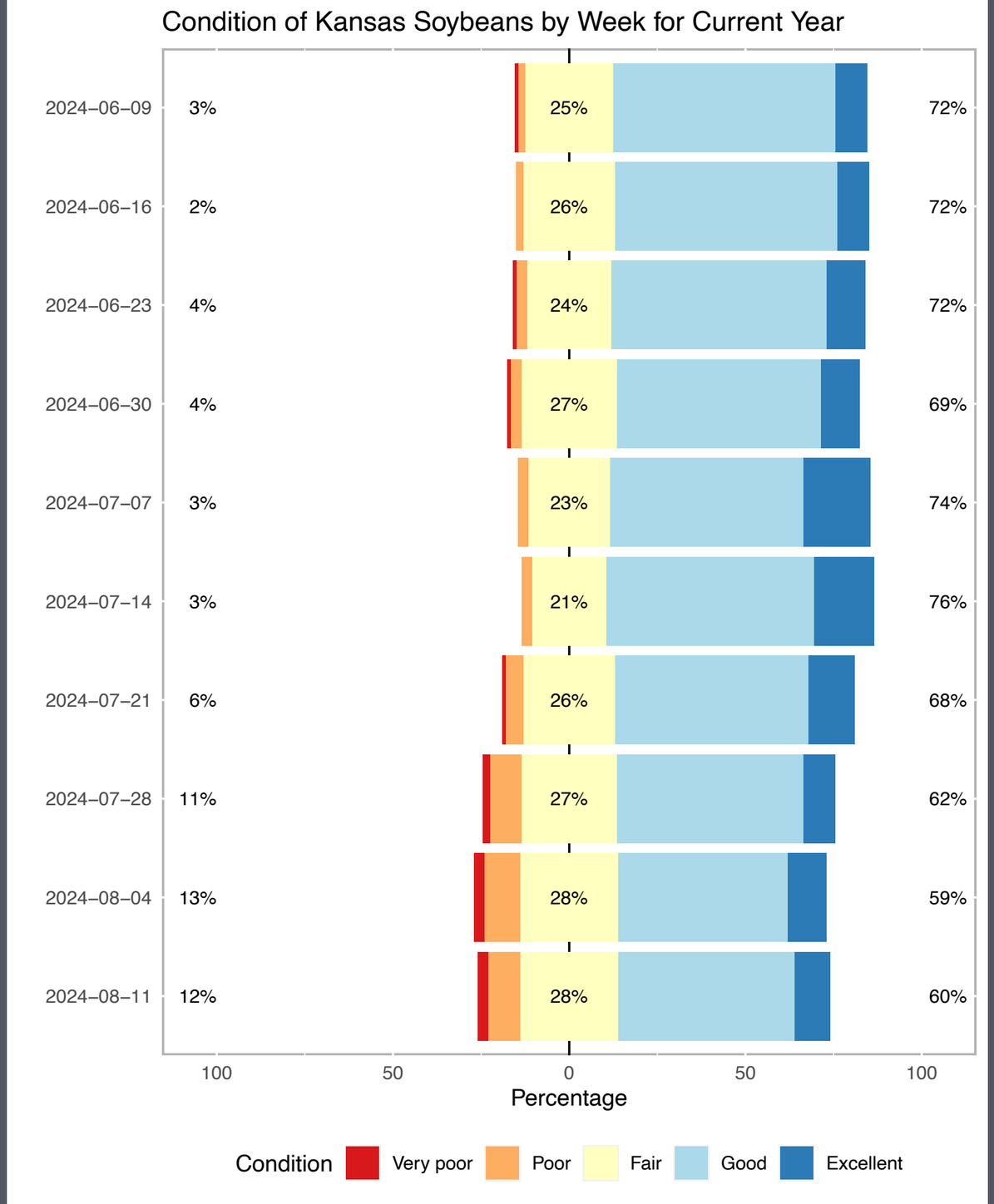
US yields have been improving each week

- Easily a record US yield
- Can trendline yields be believed?
- Crop production report has a 1% increase in acres
  - total production in US is expected to be a record

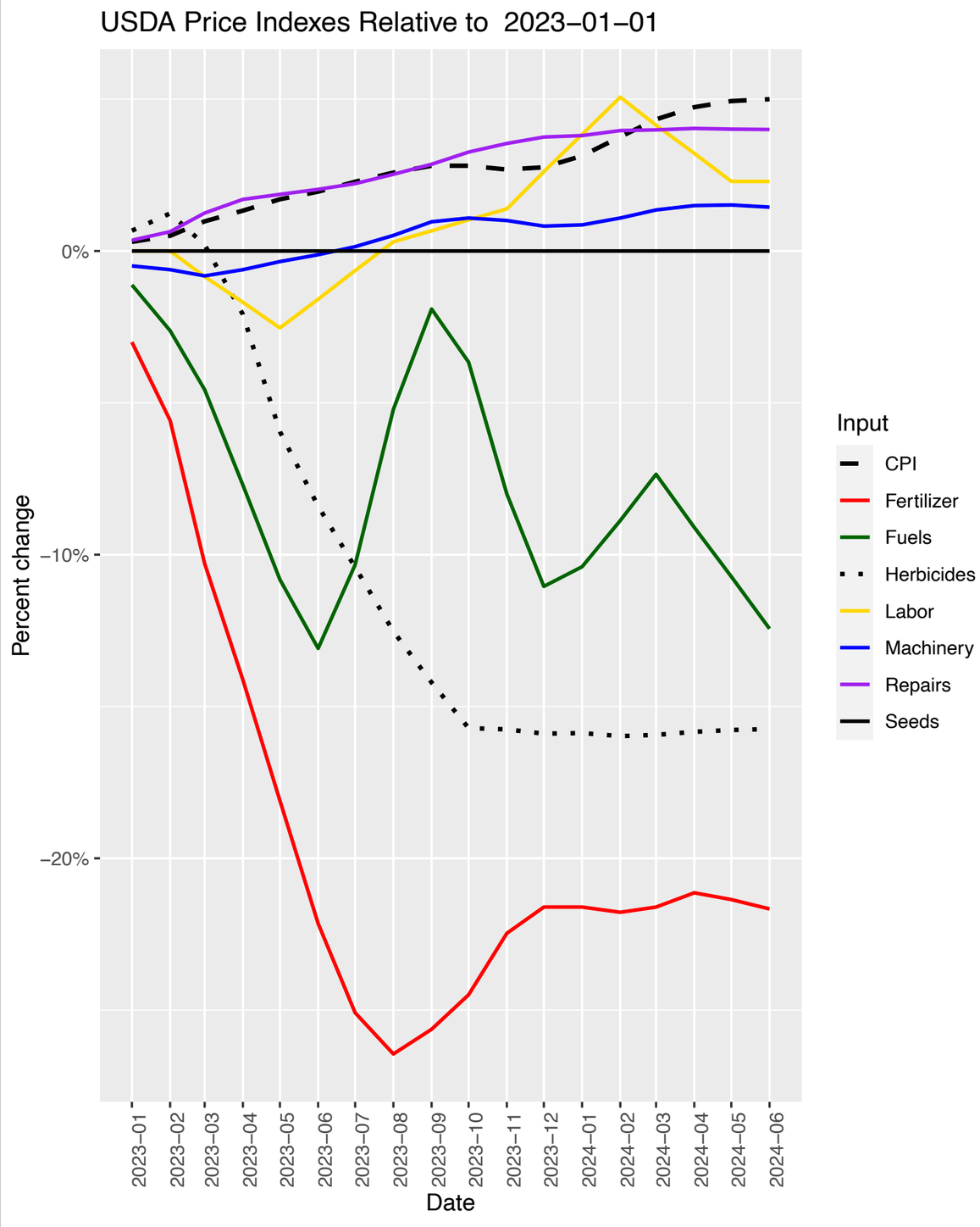

Kansas Topsoil Moisture as of WEEK #32 8/11/24
2024 54% 44% 2%
2023 43% 50% 7%
2022 82% 18% 0%
2021 46% 52% 2%
2020 24% 68% 8%
2019 32% 62% 6%
2018 40% 58% 2%
2017 33% 59% 8%
2016 18% 75% 7%
2015 22% 72% 6%
2014 40% 58% 2%
2013 21% 53% 26%
2012 96% 4% 0%
2011 59% 39% 2%
2010 59% 40% 1%
2009 37% 62% 1%
2008 26% 65% 9%
2007 49% 49% 2%
2006 84% 16% 0%
2005 62% 36% 2%
2004 24% 73% 3%
100 50 0 50 100
Percentage
Moisture Very short Short Adequate Surplus

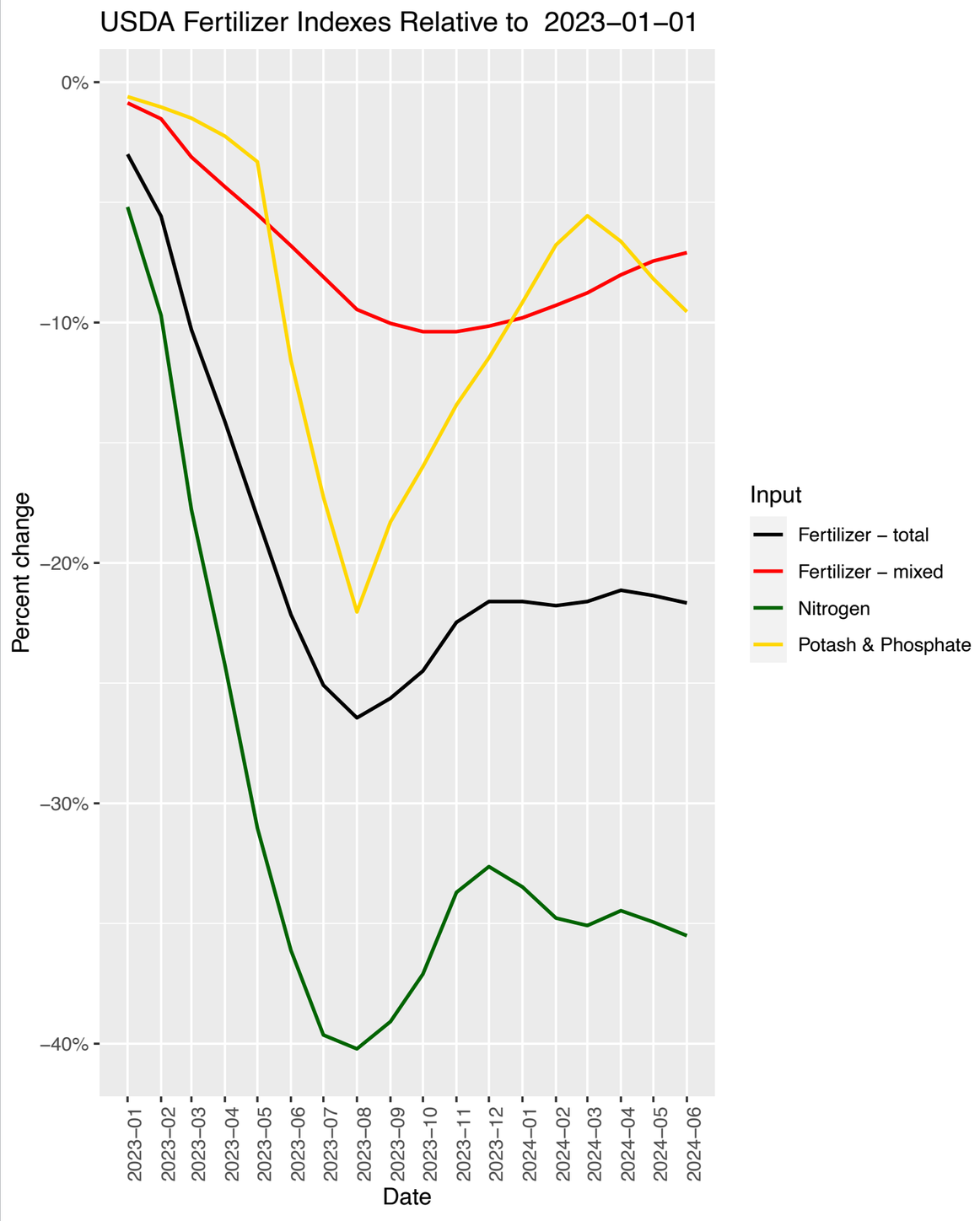

Kansas topsoil Moisture for Current Year
2024–01–28 20% 65% 15%
2024–02–25 30% 67% 3%
2024–03–03 42% 56% 2%
2024–03–10 38% 58% 4%
2024–03–17 41% 55% 4%
2024–03–24 45% 51% 4%
2024–03–31 46% 50% 4%
2024–04–07 58% 38% 4%
2024–04–14 65% 34% 1%
2024–04–21 65% 34% 1%
2024–04–28 56% 35% 9%
2024–05–05 49% 40% 11%
2024–05–12 46% 43% 11%
2024–05–19 39% 51% 10%
2024–05–26 38% 54% 8%
2024–06–02 28% 57% 15%
2024–06–09 27% 61% 12%
2024–06–16 31% 63% 6%
2024–06–23 34% 61% 5%
2024–06–30 30% 64% 6%
2024–07–07 20% 70% 10%
2024–07–14 32% 63% 5%
2024–07–21 33% 63% 4%
2024–07–28 46% 52% 2%
2024–08–04 55% 43% 2%
2024–08–11 54% 44% 2%
100 50 0 50 100
Percentage
Moisture Very short Short Adequate Surplus


Condition of Kansas Corn by Week for Current Year
2024–05–19 13% 29% 58%
2024–05–26 7% 32% 61%
2024–06–02 6% 30% 64%
2024–06–09 5% 30% 65%
2024–06–16 6% 31% 63%
2024–06–23 6% 32% 62%
2024–06–30 9% 34% 57%
2024–07–07 7% 28% 65%
2024–07–14 11% 28% 61%
2024–07–21 15% 28% 57%
2024–07–28 17% 31% 52%
2024–08–04 22% 31% 47%
2024–08–11 23% 31% 46%
100 50 0 50 100
Percentage
Condition Very poor Poor Fair Good Excellent


Condition of Kansas Soybeans by Week for Current Year
2024–06–09 3% 25% 72%
2024–06–16 2% 26% 72%
2024–06–23 4% 24% 72%
2024–06–30 4% 27% 69%
2024–07–07 3% 23% 74%
2024–07–14 3% 21% 76%
2024–07–21 6% 26% 68%
2024–07–28 11% 27% 62%
2024–08–04 13% 28% 59%
2024–08–11 12% 28% 60%
100 50 0 50 100
Percentage
Condition Very poor Poor Fair Good Excellent

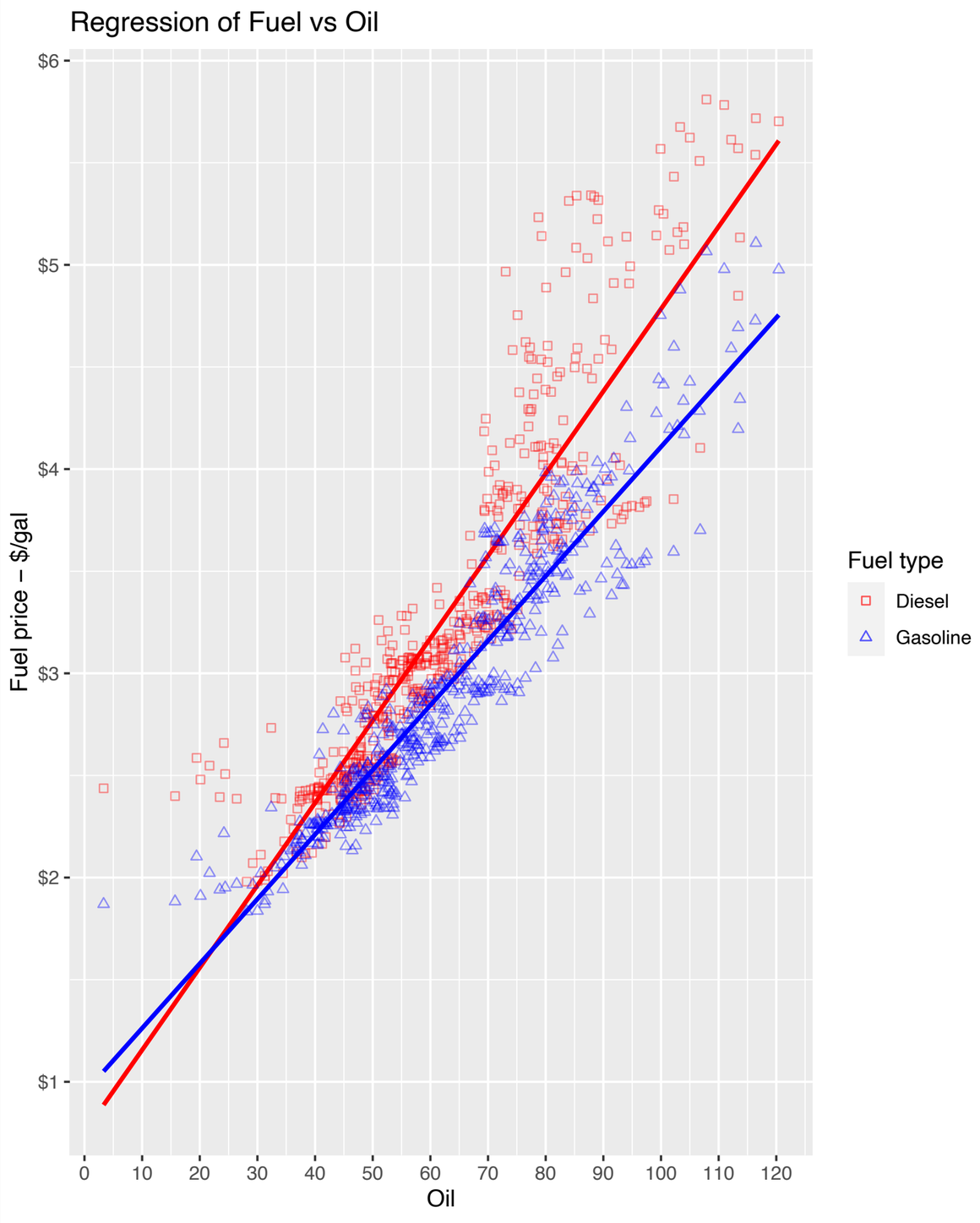
Input outlook


USDA Price Indexes Relative to 2023–01–01
0%
–10%
–20%
Percent change
2023–01
2023–02
2023–03
2023–04
2023–05
2023–06
2023–07
2023–08
2023–09
2023–10
2023–11
2023–12
2024–01
2024–02
2024–03
2024–04
2024–05
2024–06
Date
Input
CPI
Fertilizer
Fuels
Herbicides
Labor
Machinery
Repairs
Seeds


USDA Fertilizer Indexes Relative to 2023–01–01
0%
–10%
–20%
–30%
–40%
Percent change
2023–01
2023–02
2023–03
2023–04
2023–05
2023–06
2023–07
2023–08
2023–09
2023–10
2023–11
2023–12
2024–01
2024–02
2024–03
2024–04
2024–05
2024–06
Date
Input
Fertilizer – total
Fertilizer – mixed
Nitrogen
Potash & Phosphate

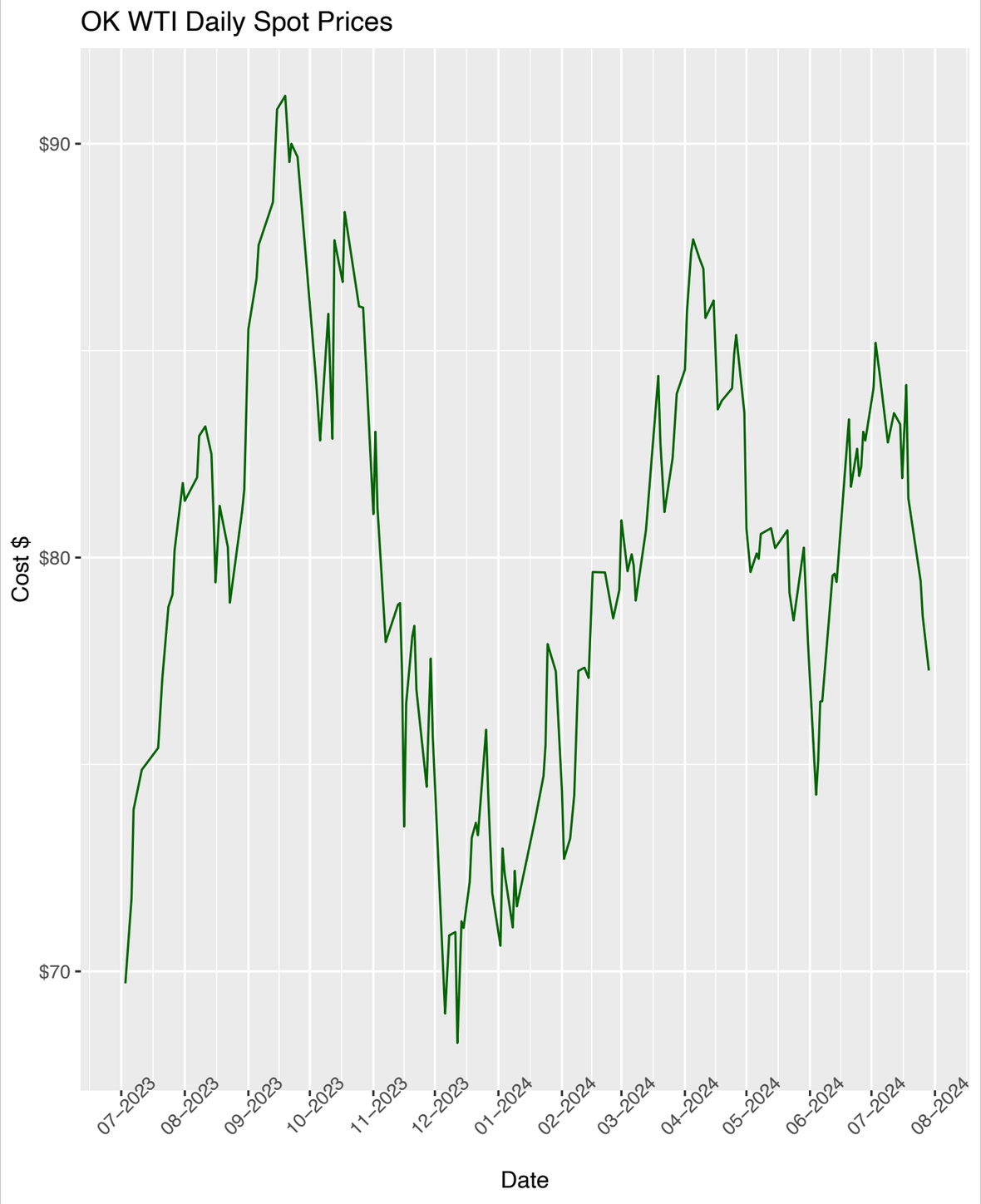
Input prices for the next year

- oil and diesel
- fertilizer



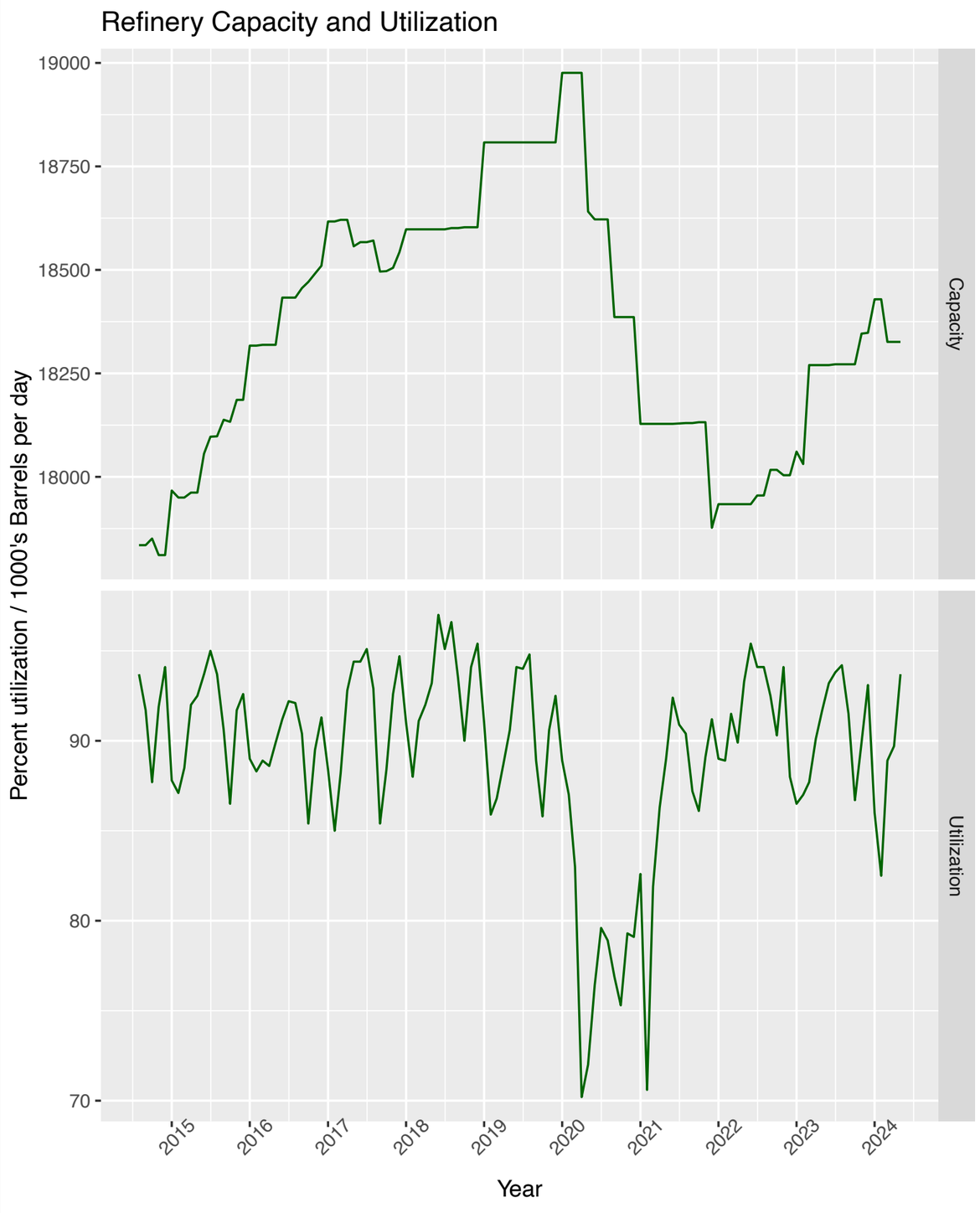
Predicting oil prices is the key to diesel prices

- High correlation between oil and diesel
  - Not as strong as oil and gas though
- This regression line is not as accurate as it once was
  - Diesel seems to have more price variability
  - More of a recent issue



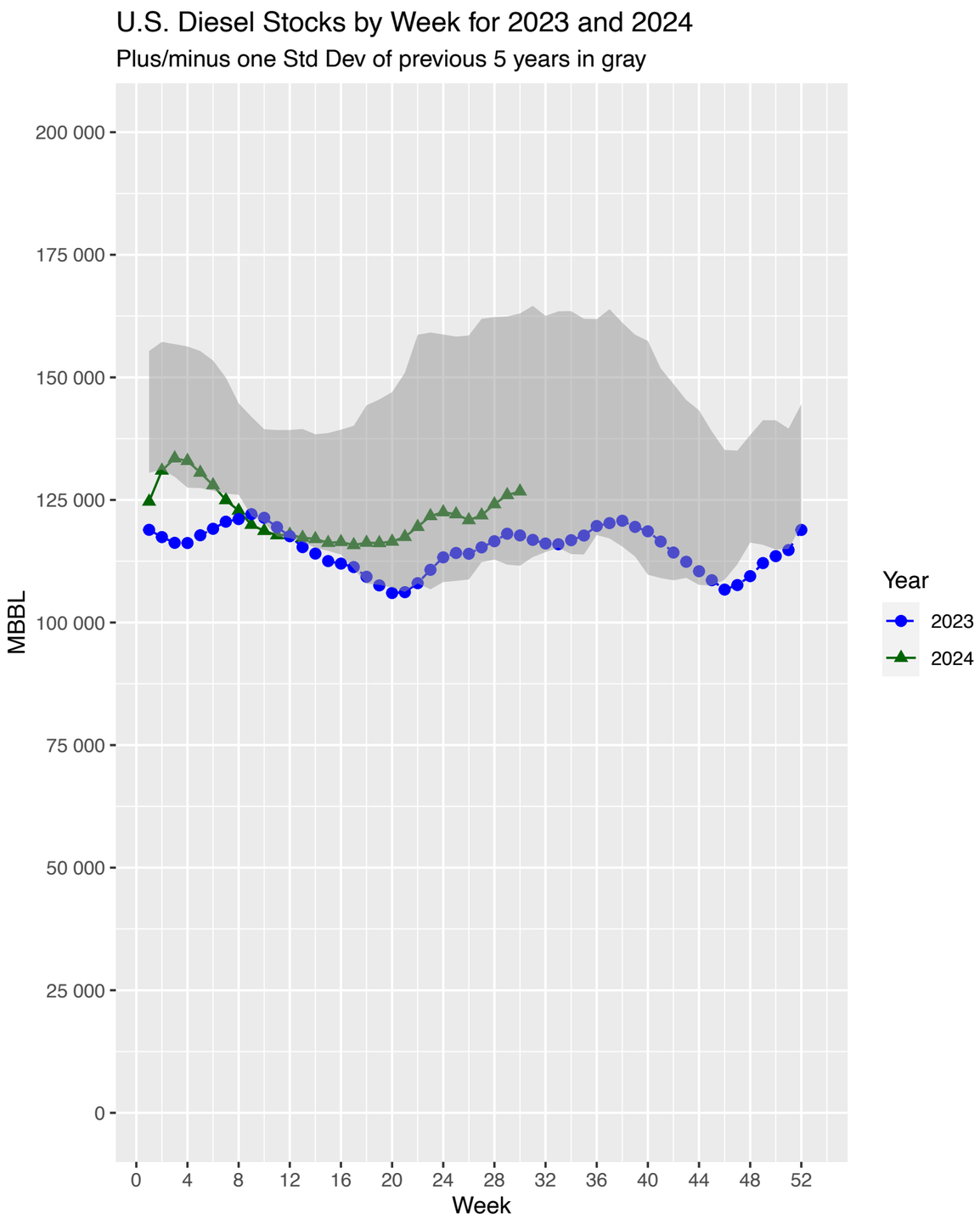
Oil prices for the last year

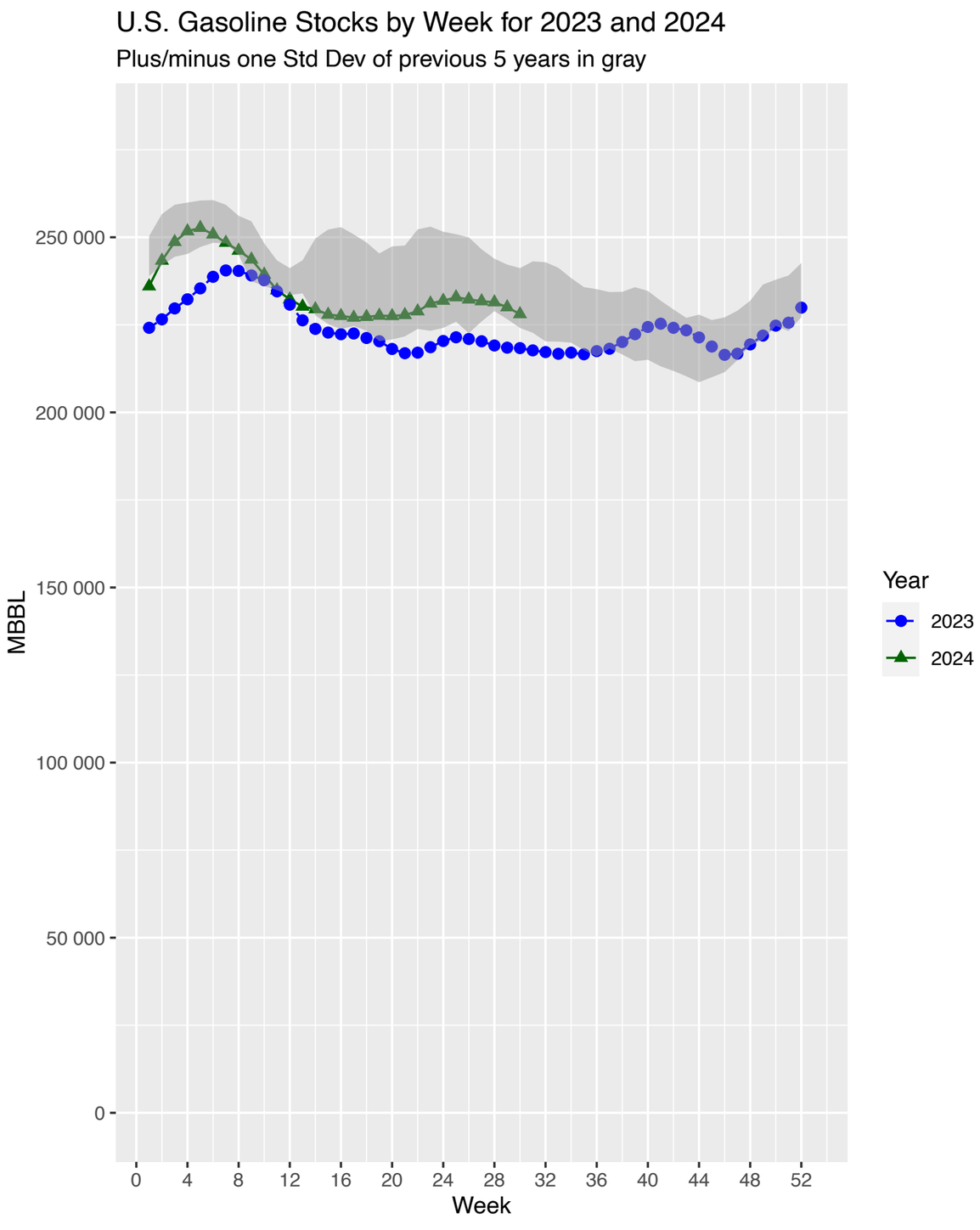
- $68 to $90 range
- Russian/Ukraine war premium seems to have vanished
  - At the start of war, oil was at $130
  - Maybe there should be more of a war premium
  - Ukraine is now targeting Russian oil refineries
- Oil futures provide little information
  - Futures market actually has oil going **below $70**



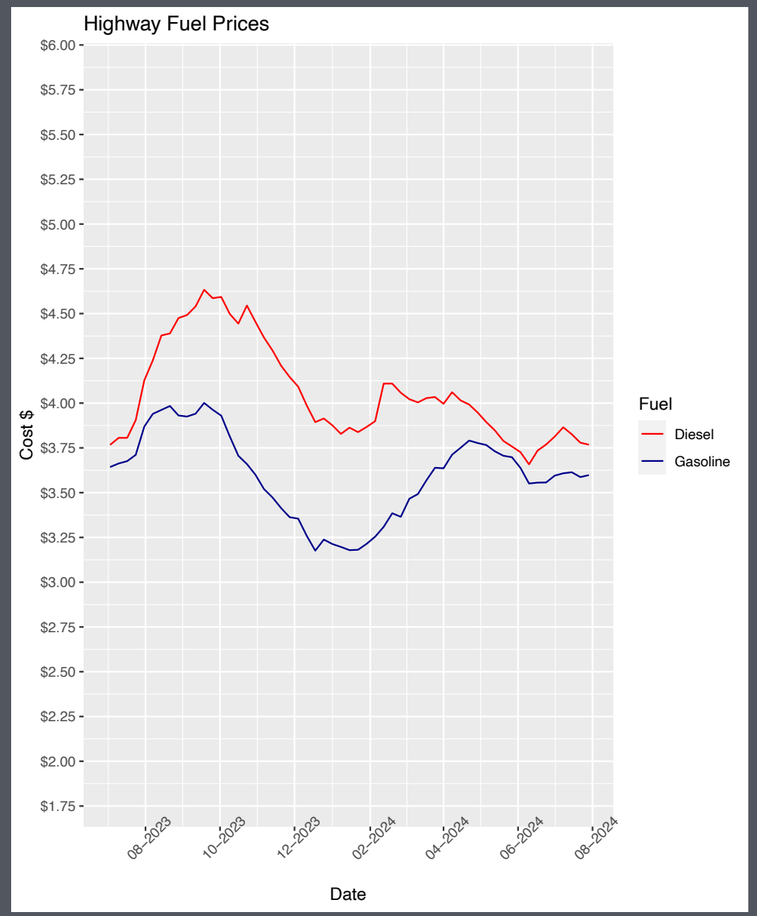
Refinery issues still a concern

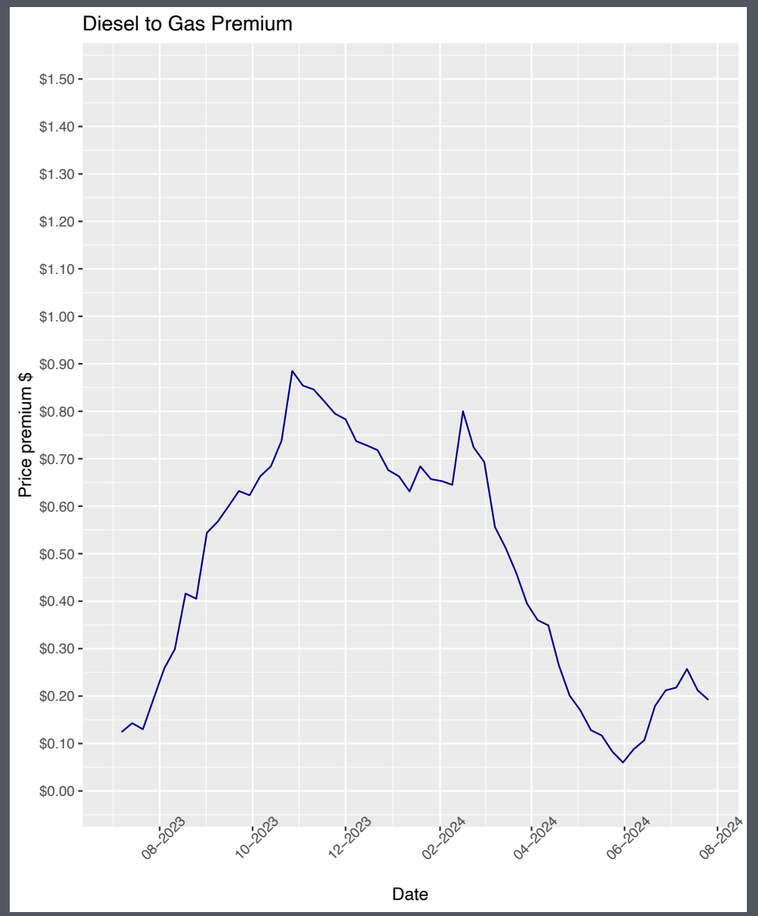
- We are one hurricane or refinery fire away from a major price shock
- Major reason why gas and diesel stock remain relatively low

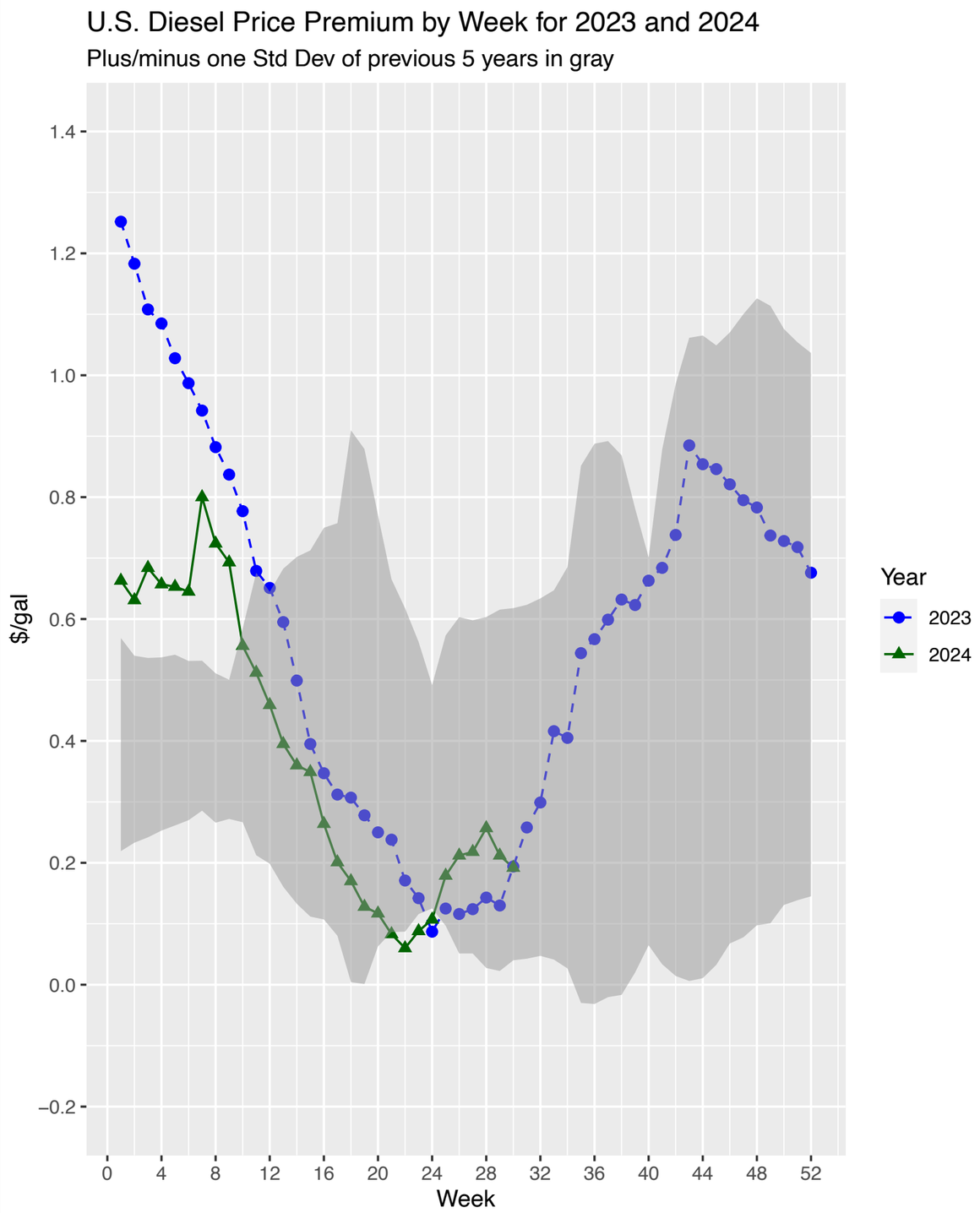

U.S. Diesel Stocks by Week for 2023 and 2024
Plus/minus one Std Dev of previous 5 years in gray
MBBL
200 000
175 000
150 000
125 000
100 000
75 000
50 000
25 000
0
0
4
8
12
16
20
24
28
32
36
40
44
48
52
Week
Year
2023
2024


U.S. Gasoline Stocks by Week for 2023 and 2024
Plus/minus one Std Dev of previous 5 years in gray
MBBL
250 000
200 000
150 000
100 000
50 000
0
0
4
8
12
16
20
24
28
32
36
40
44
48
52
Week
Year
2023
2024

Price premium of diesel for last 12 months

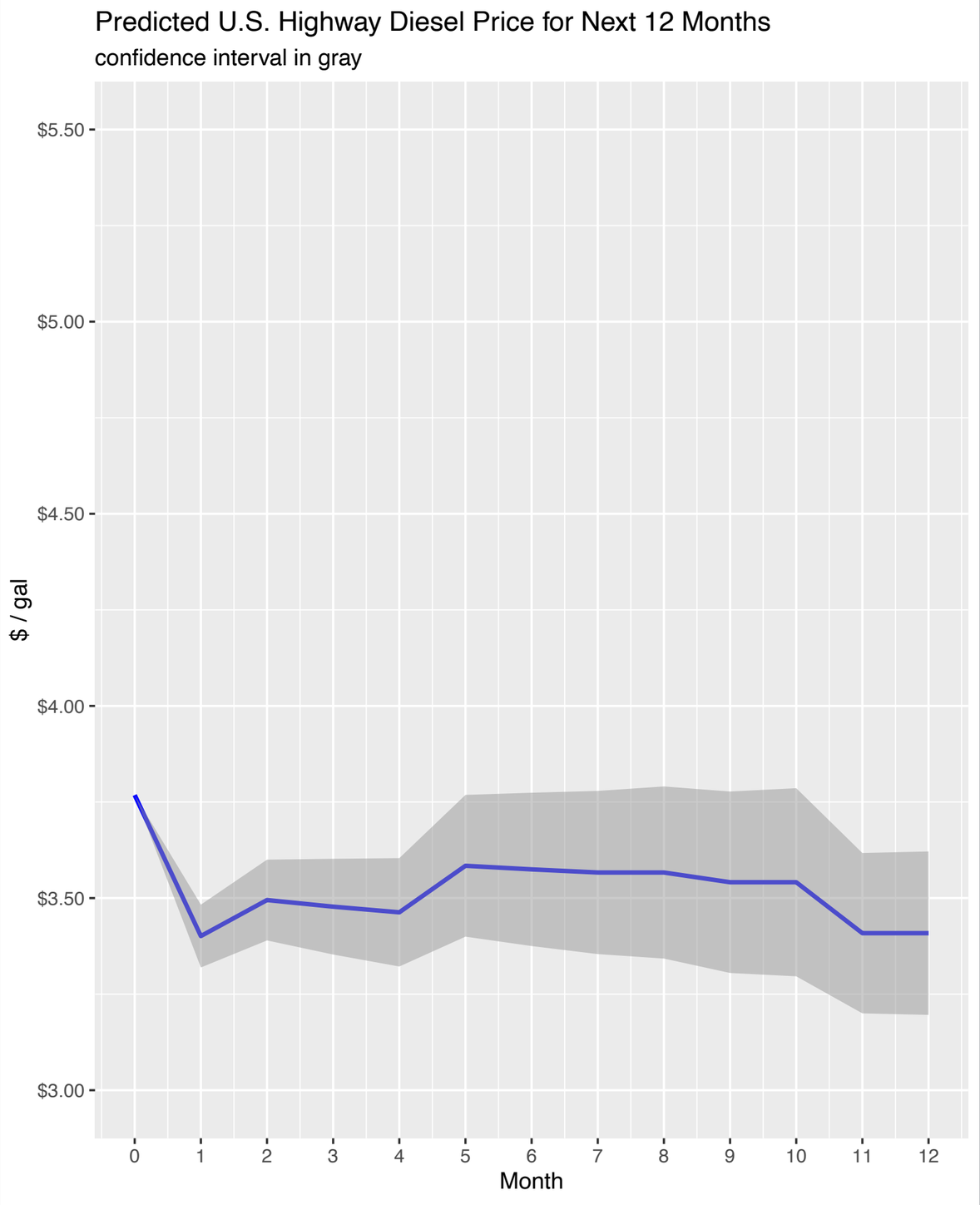






The price premium of diesel has behaved differently the last 2 years

- In past years the premium has been more consistent
- In the distant past, the premium was consistently smaller
- $0.50 seems to be the more recent premium



Diesel price prediction for the next 12 months

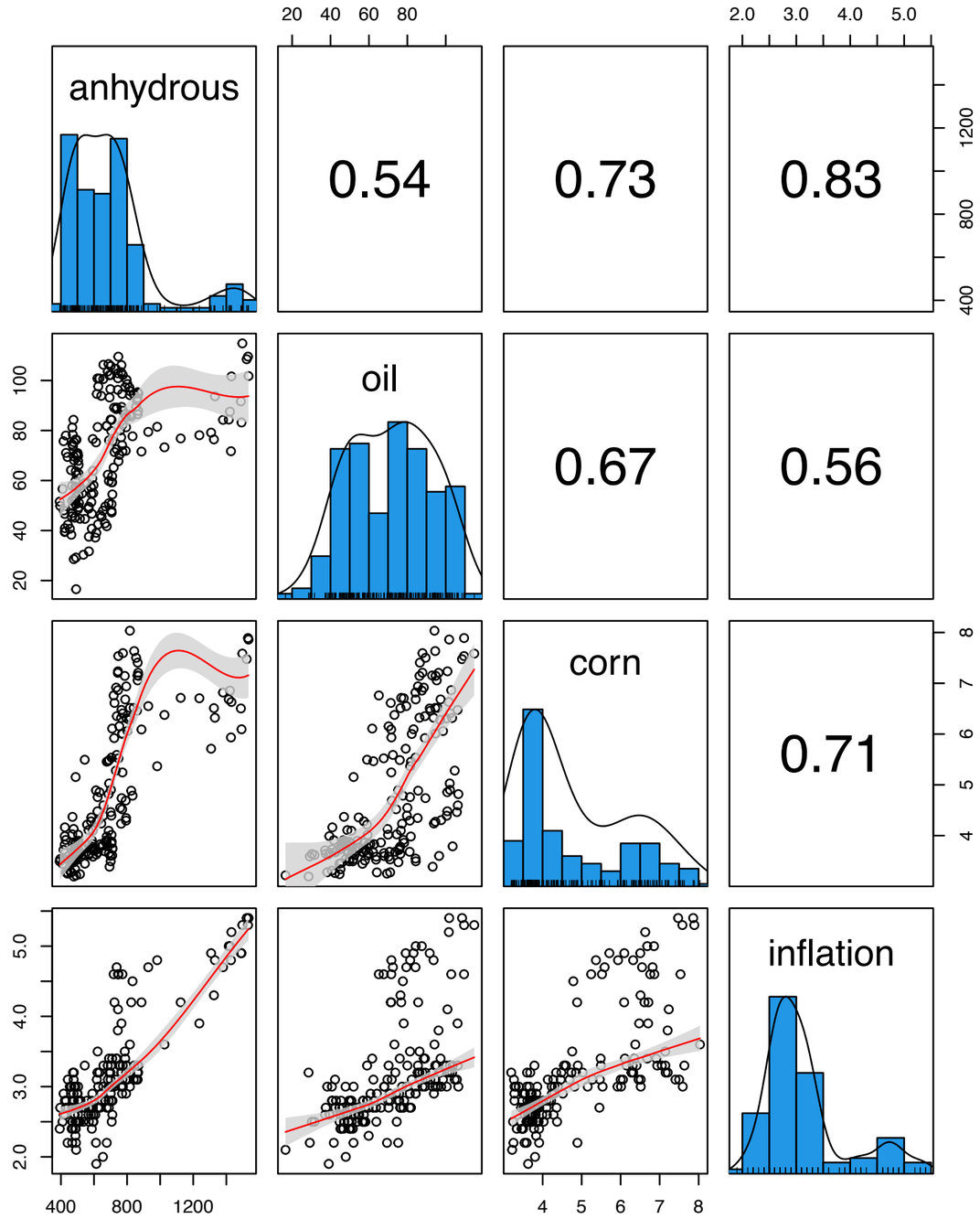
- Based on oil futures market and the diesel premium
- Assumption that the premium is following the same pattern as last year
- Is the oil futures price too low?
  - should there be a bigger confidence interval on estimate?

Fertilizer

Latest fertilizer prediction model

Term	Coefficient	P-value
Intercept	-329.04	< 0.001
Oil (lag 6 mo)	2.97	< 0.001
Corn	38.16	0.001
Inflation (lead 2 mo)	200.31	< 0.001

- based on corn futures price
- oil price
  - lag 6 months
- inflation expectations
  - 2 month lead

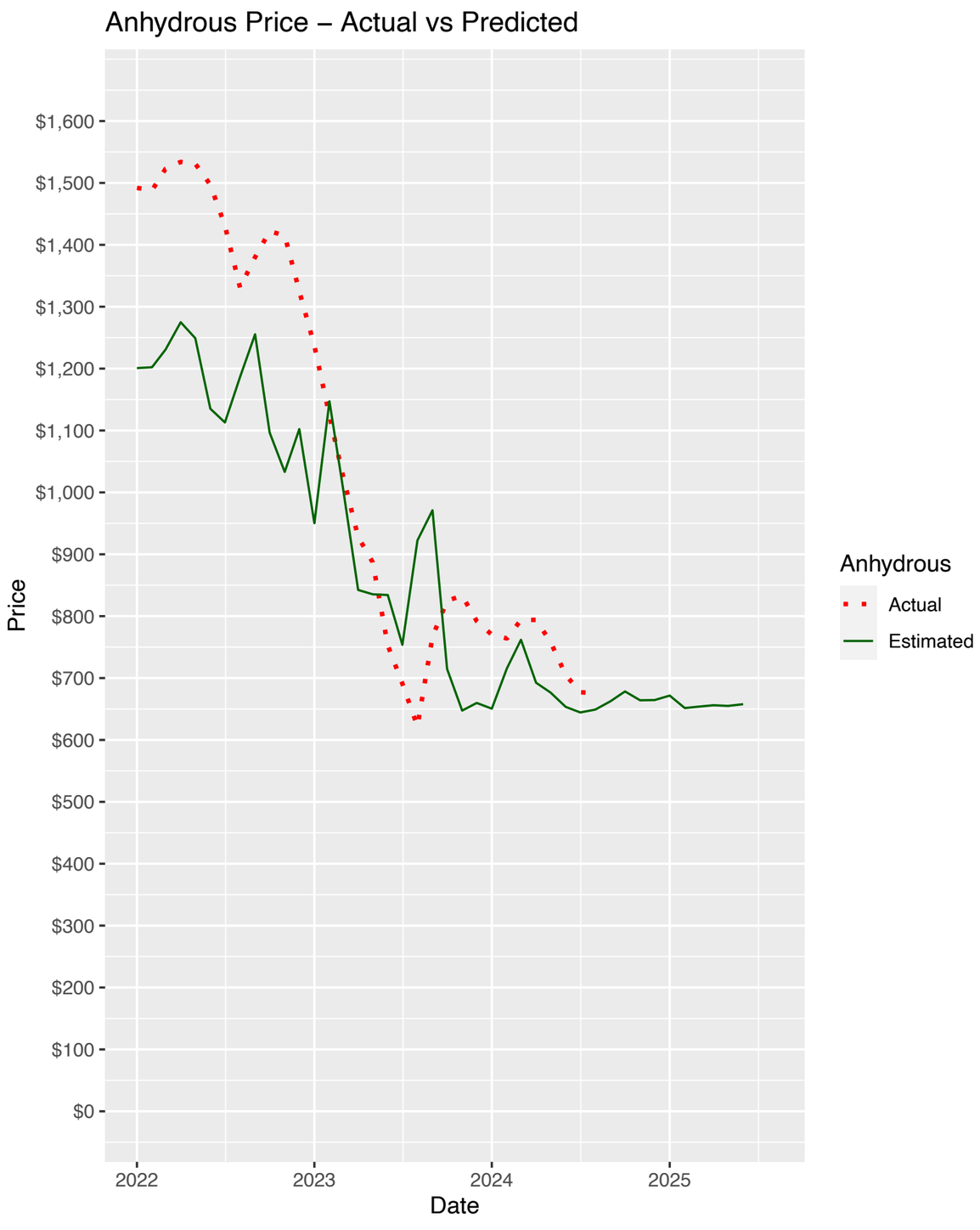


Adding inflation expectations helped model

- Original model (using corn and oil) didn't predict $1000 AA
- Model has the highest correlation with inflation
- Model has limited data points for when AA is > $1,000

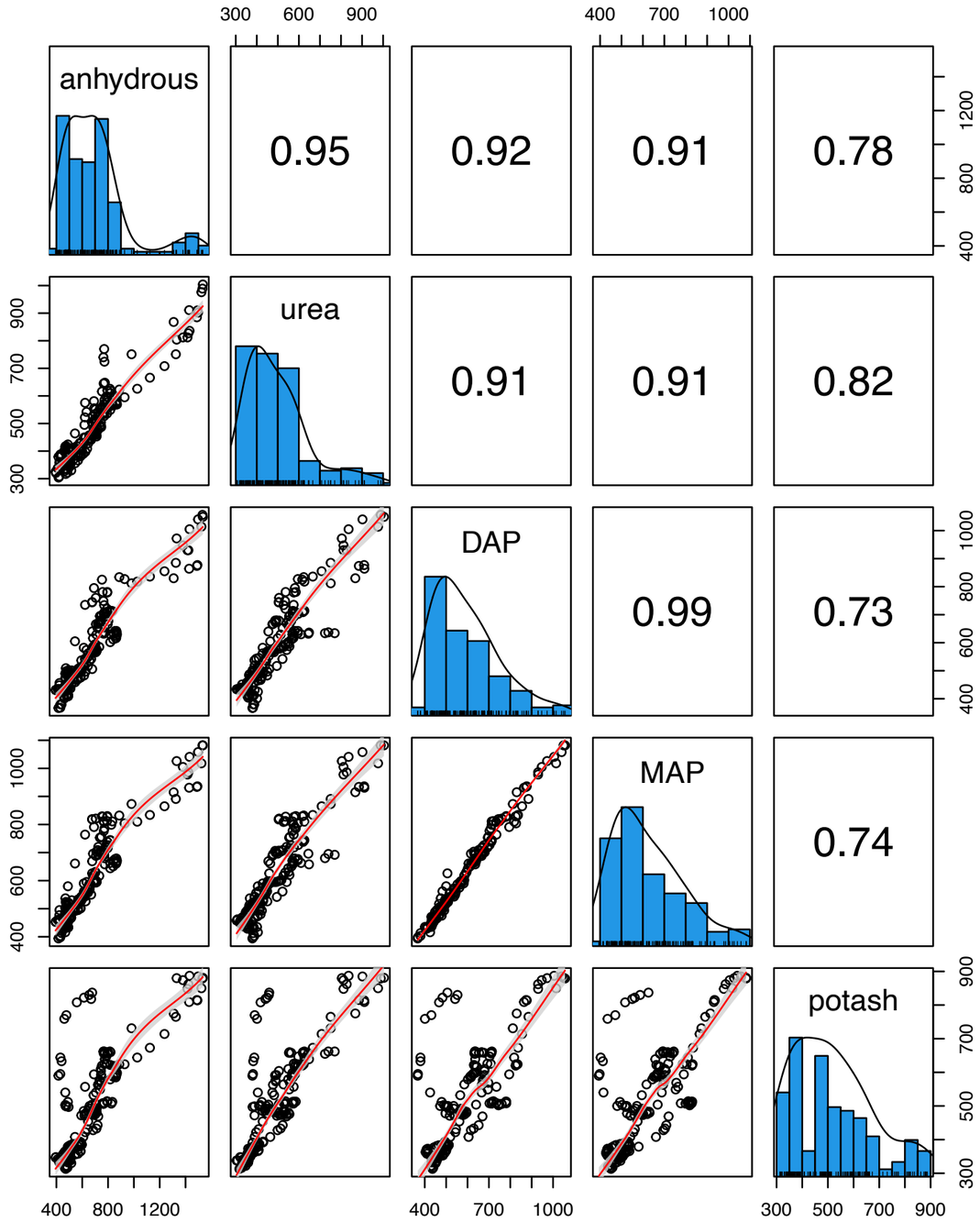
How has model worked in the past

- 0.73 correlation
  - very good
- Overestimating current price at the moment
  - may be due to my estimate of inflation



Prediction for next 12 months

- Using inflation rate of 3%
- Oil prices in the mid $70's



High correlation among all fertilizers

- Many wildcards with fertilizer predictions
  - Russian/Ukraine war is important
  - Russia is one of the biggest oil exporters
  - Russia is also a big fertilizer exporter

More detail on NFI prediction

	2022	2023	2024(p)	Est 2025
Income				
Livestock VFP	$ 66,754	$ 99,276	$ 110,394	$ 110,394
Corn	262,091	222,807	248,788	289,153
Grain sorghum	37,782	31,646	32,009	39,027
Soybeans	201,404	169,391	230,497	220,852
Wheat	149,723	127,271	98,204	110,797
Govt payment (farm bill only)	24,807	24,193	12,323	19,366
Crop ins proceeds	153,022	124,182	39,536	38,712
Crop VFP	$ 907,957	$ 781,420	$ 744,452	$ 802,246
TOTAL VFP	**$ 974,711**	**$ 880,695**	**$ 854,846**	**$ 912,641**
Expenses				
Seed/Other Crop Expenses	83,903	90,995	93,398	93,398
Crop Insurance	32,778	34,063	34,208	35,918
Fertilizer-Lime	161,985	150,578	143,905	155,417
Gas-Fuel-Oil	41,040	36,604	36,712	36,712
Herbicide-Insecticide	102,769	104,213	108,124	111,368
Total Operating Expenses	$ 662,490	$ 667,838	$ 680,497	$ 704,780
Interest paid	22,390	27,230	28,592	28,592
Depreciation - machinery	78,256	87,071	91,424	95,995
Total Farm Expenses	***$ 771,267***	***$ 791,028***	***$ 809,847***	***$ 839,168***
Net Farm Income	***$ 203,445***	***$ 89,667***	***$ 44,999***	***$ 73,473***

Net Farm Income - state				
	2022	2023	2024(p)	Est 2025
NFI	$ 203,445	$ 89,667	$ 44,999	$ 73,473
% Change	0	-56%	-50%	63%

Net Farm Income - east				
	2022	2023	2024(p)	Est 2025
NFI	$ 199,177	$ 105,391	$ (7,420)	$ 31,909
% Change	0	-47%	-107%	-530%

Net Farm Income - central				
	2022	2023	2024(p)	Est 2025
NFI	$ 160,143	$ 61,311	$ 106,460	$ 109,946
% Change	0	-62%	74%	3%

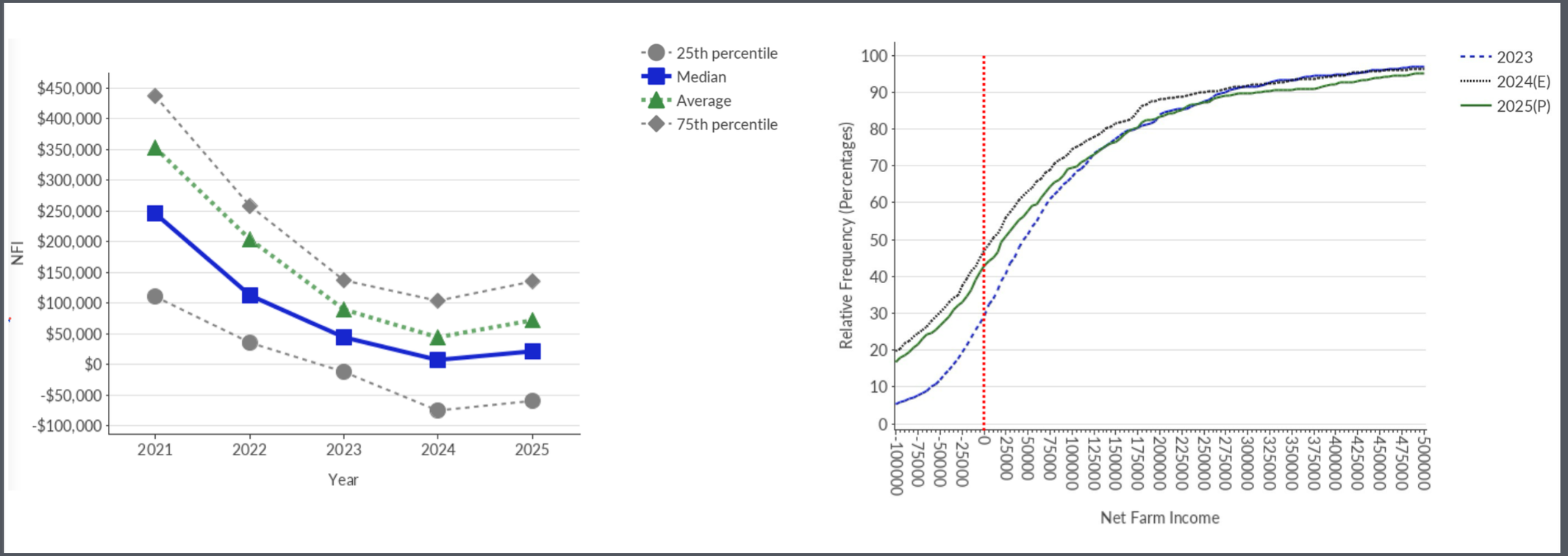
Net Farm Income - west				
	2022	2023	2024(p)	Est 2025
NFI	$ 400,164	$ 141,271	$ 9,619	$ 96,075
% Change	0	-65%	-93%	899%

Summary of NFI

- The next couple of years look challenging based on current prices
- 2024 looks really depressing
- Some bounce back in 2025
  - about to 2023 levels

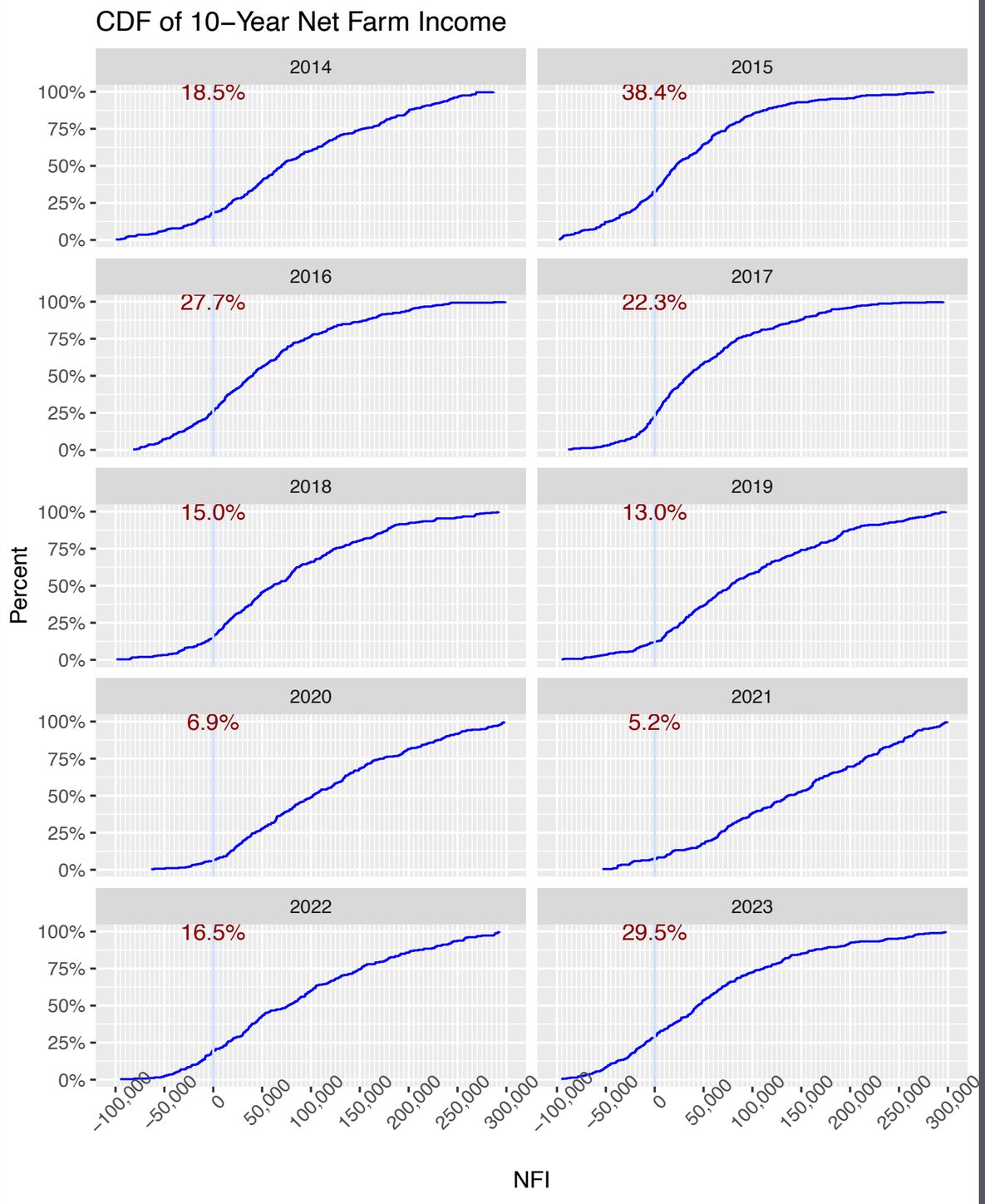
What is happening at the margins

- 50% of farms could have negative NFI this year and next



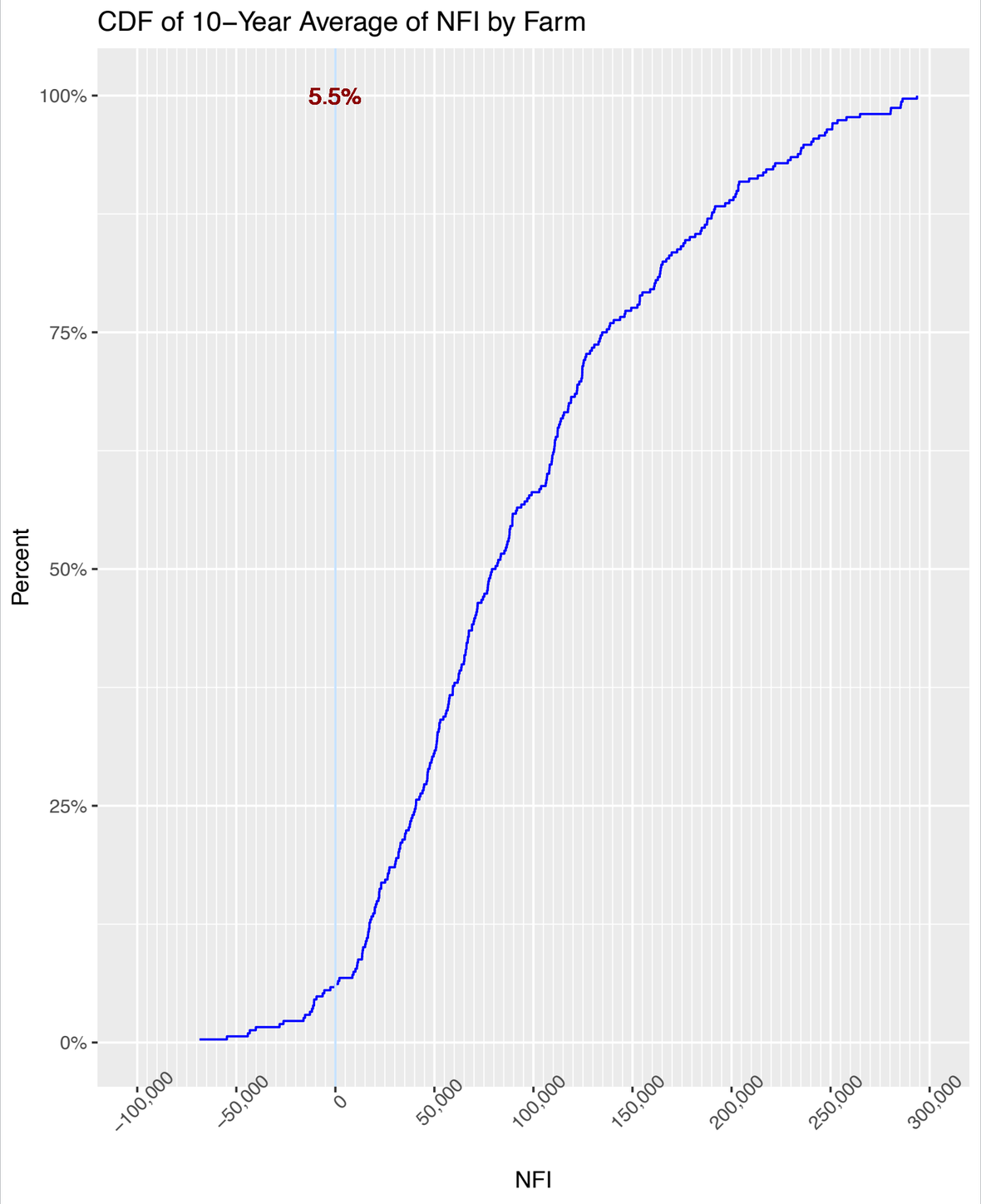
Finally, an overview of KFMA farm financials

- Debt levels
- Interest costs
- Net Farm Income
- Balance sheet situation



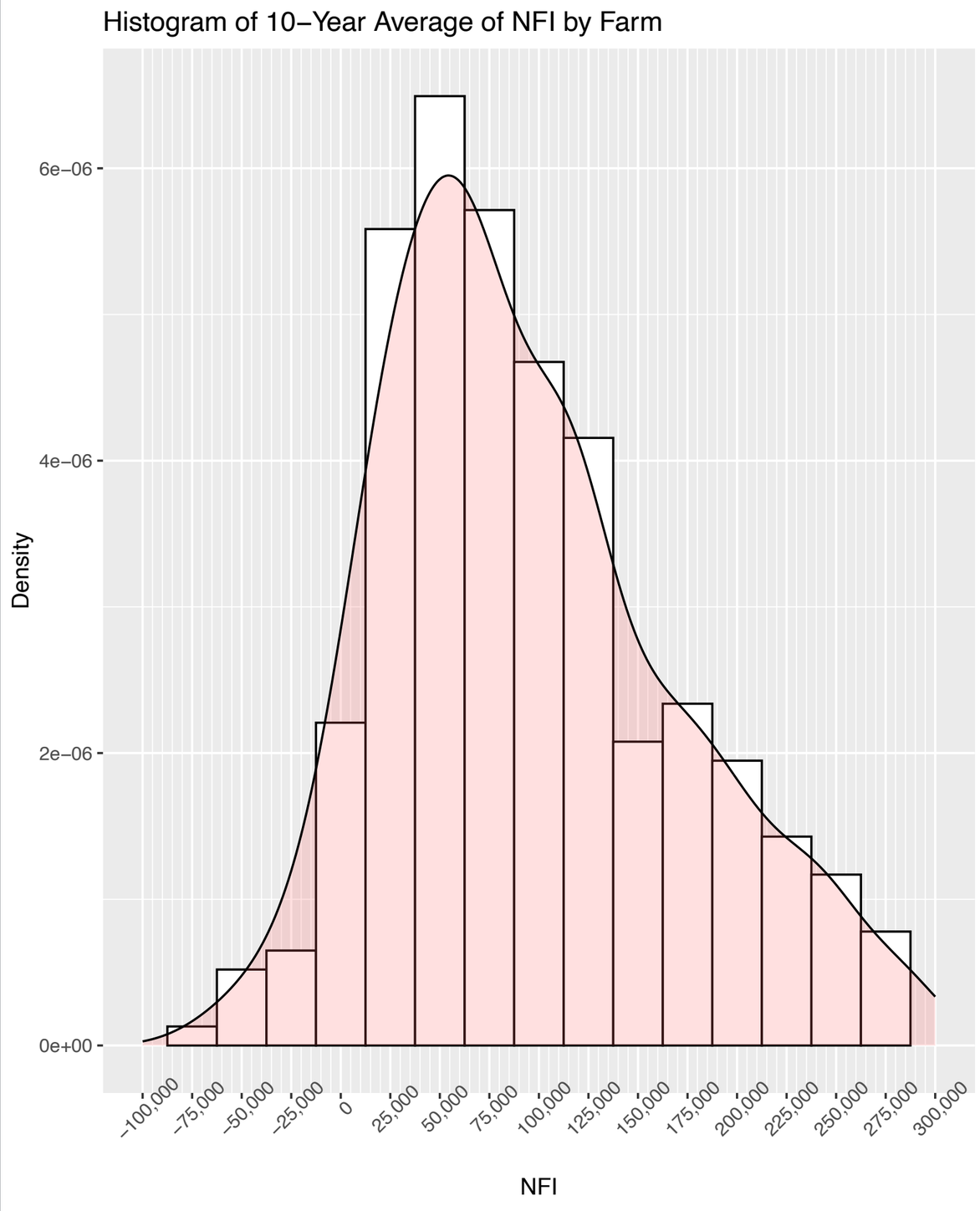
Distribution of NFI by Year

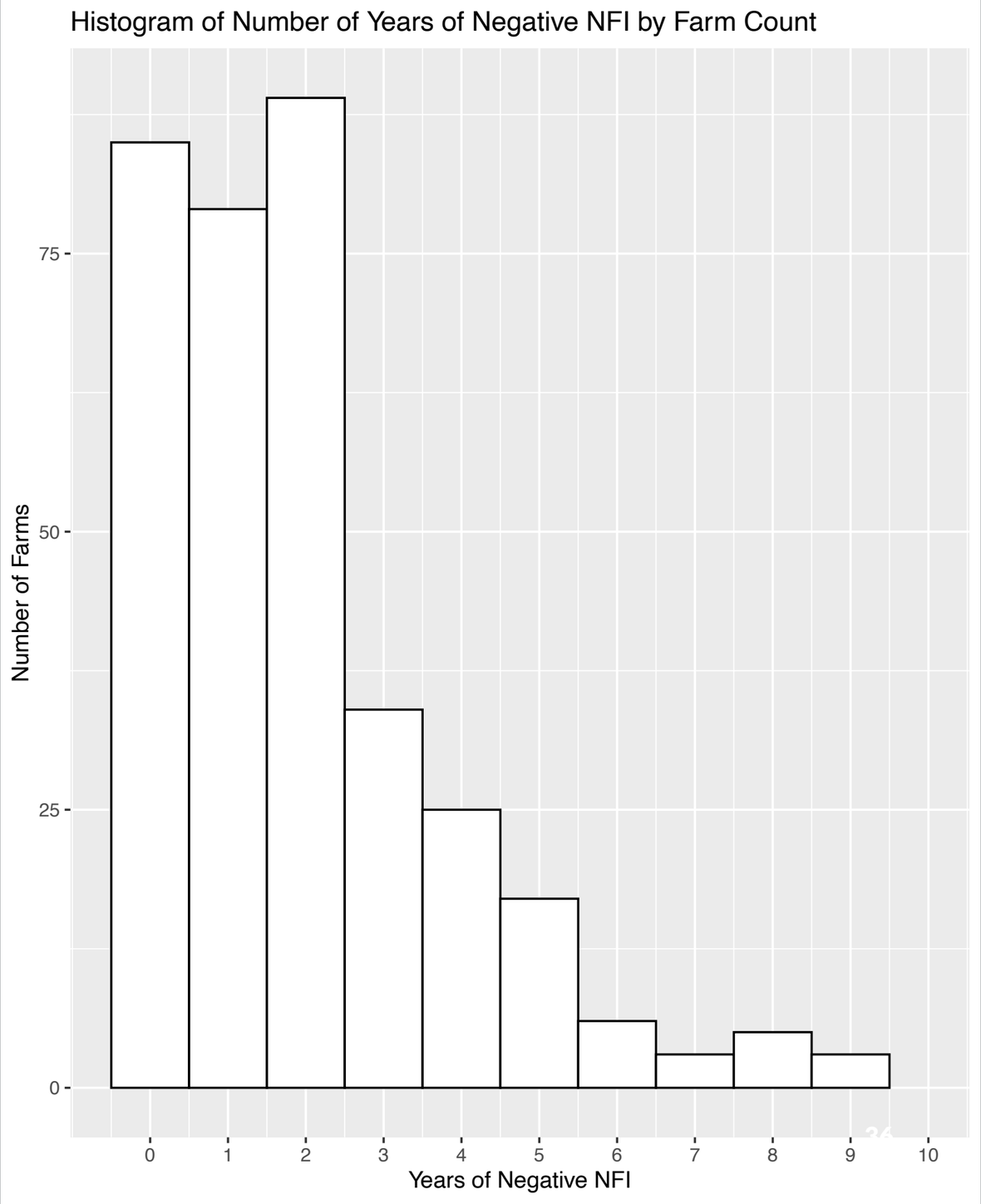
- How a CDF works
  - A point on the blue line represents the % of farmers earning that NFI or lower
  - The more horizontal the line the greater the range of NFI
  - Lines to the right are better
- Last year 30% of farmers had negative NFI
  - 2nd worse year in 10
  - on the positive side, 70% of farmers had positive NFI

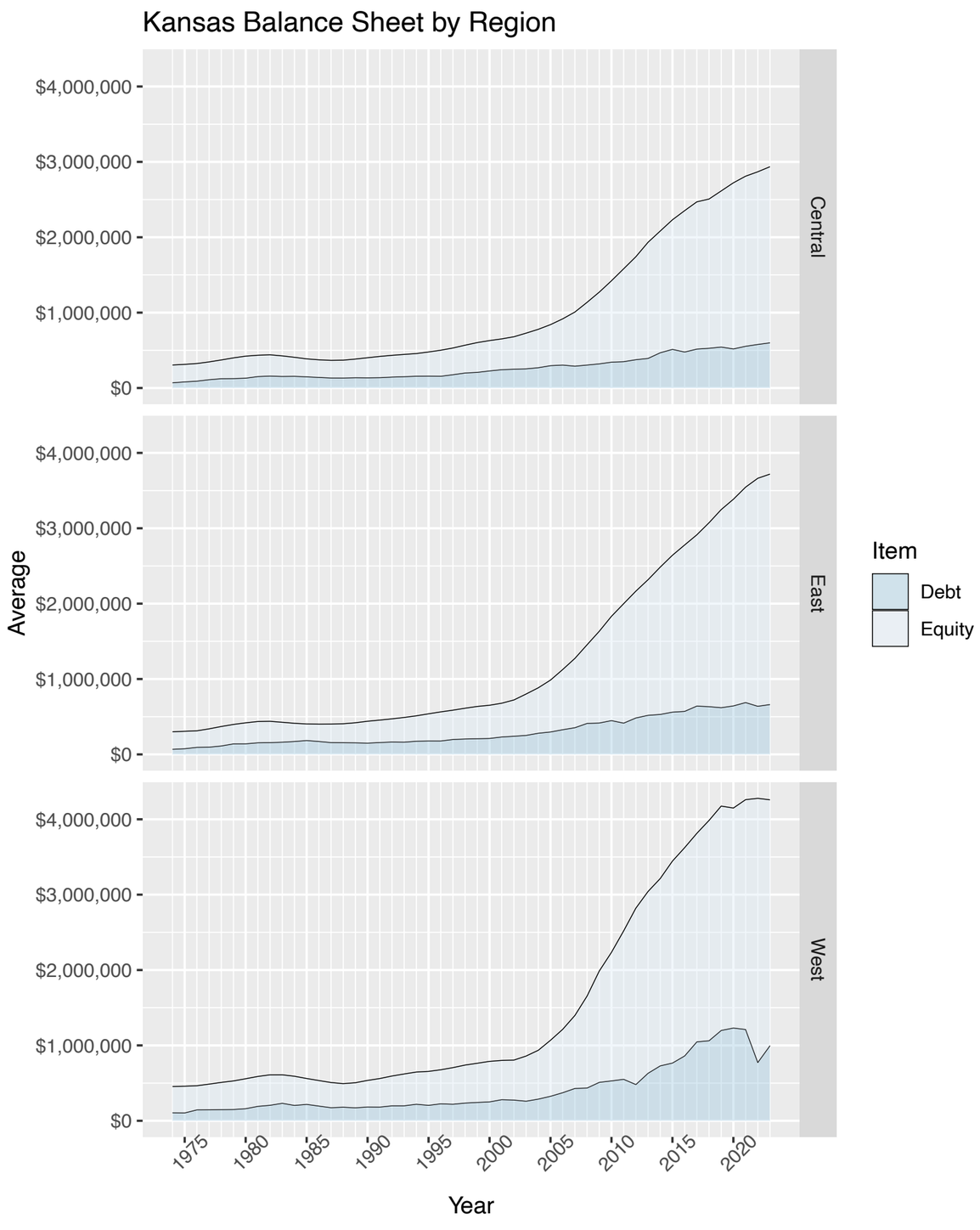


Distribution of NFI - 10 yr combined

- When averaged across 10 years, most farms are doing OK
  - Based on a panel dataset (consistent set of farms)
- There may be motives other than profit contributing to the 6% of farms with a negative 10-yr NFI
- The median NFI over 10-years was about $75,000 per year

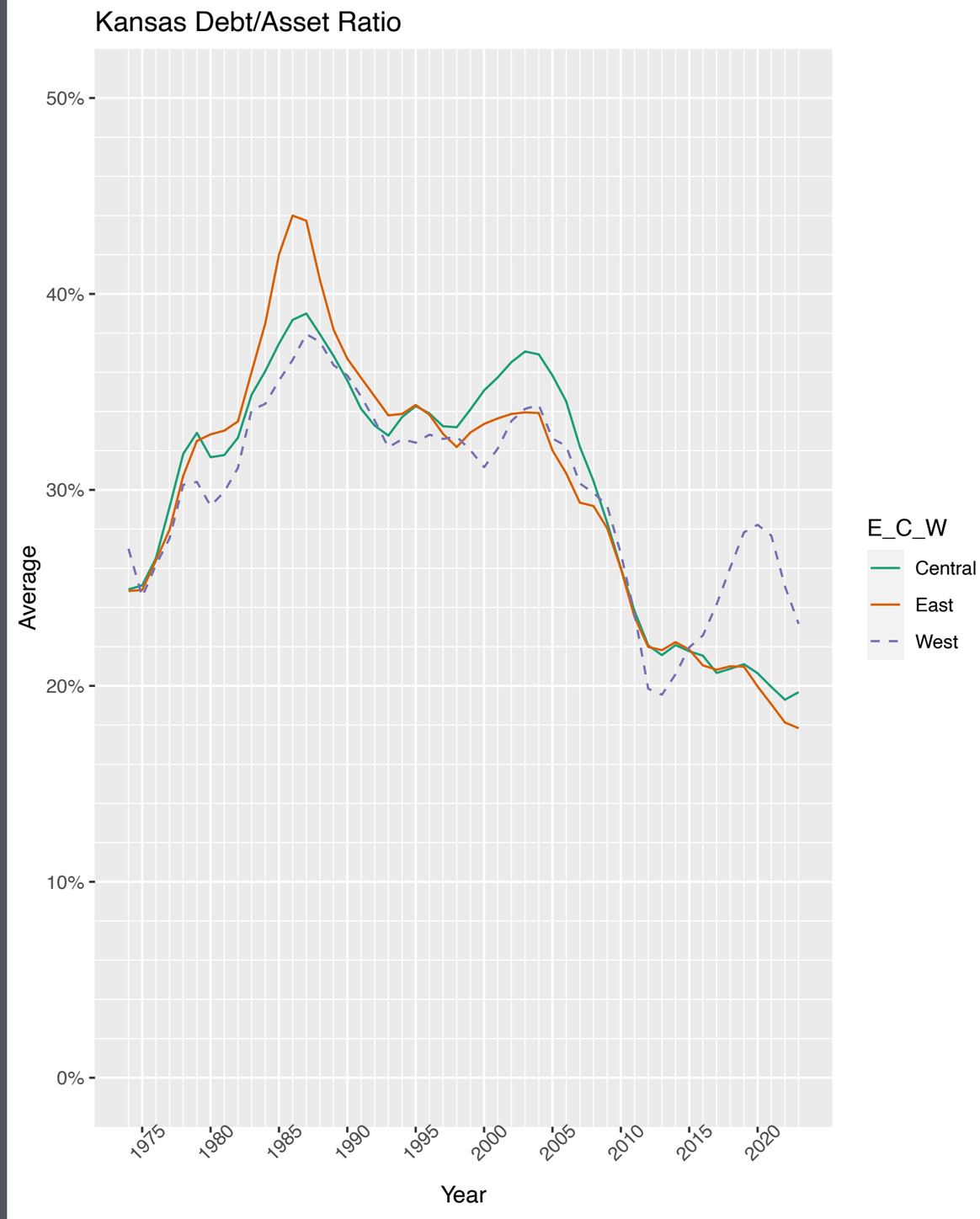

Histogram of 10−Year Average of NFI by Farm
Density
6e−06
4e−06
2e−06
0e+00
−100,000
−75,000
−50,000
−25,000
0
25,000
50,000
75,000
100,000
125,000
150,000
175,000
200,000
225,000
250,000
275,000
300,000
NFI

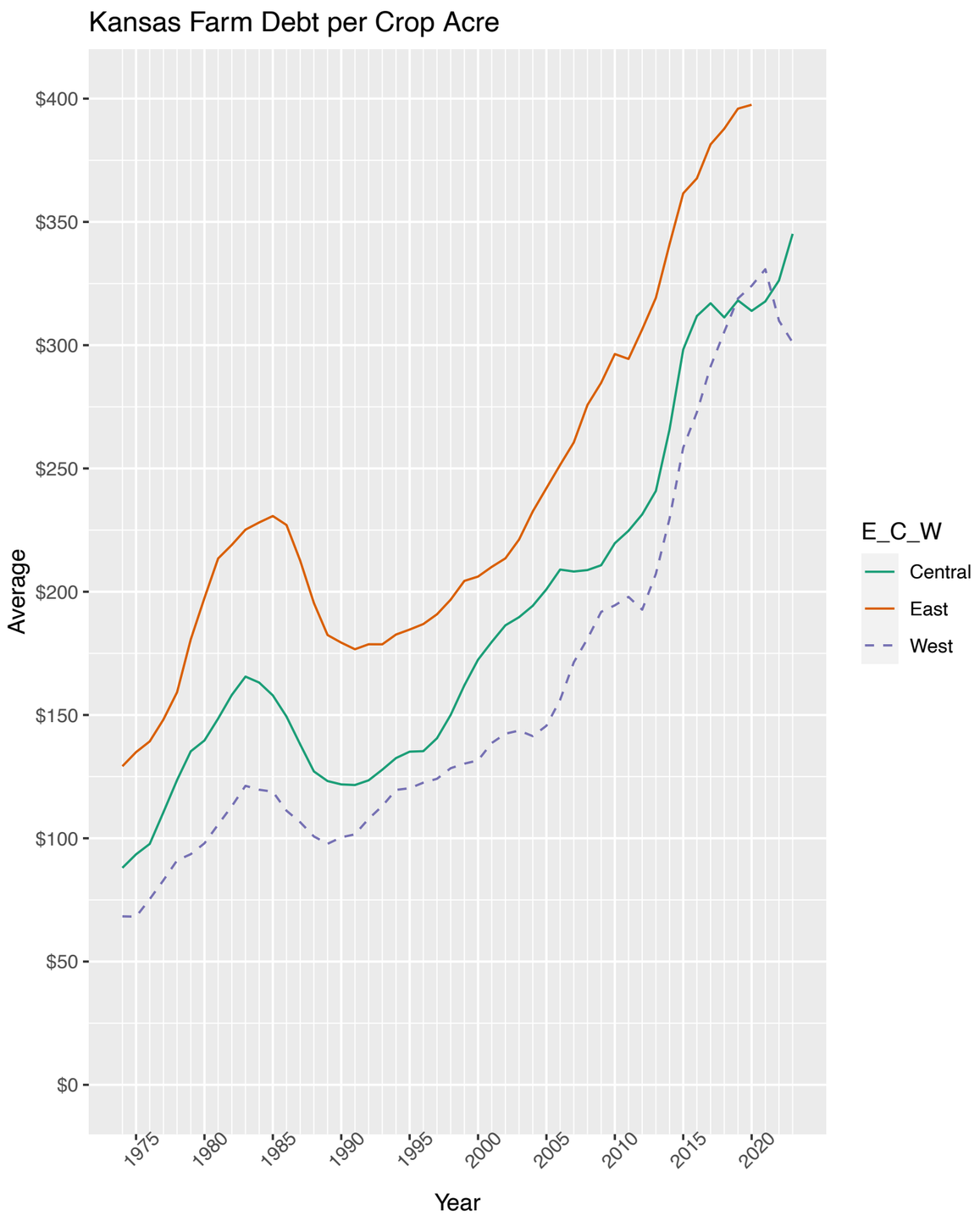

Histogram of Number of Years of Negative NFI by Farm Count
Number of Farms
75
50
25
0
0
1
2
3
4
5
6
7
8
9
10
Years of Negative NFI



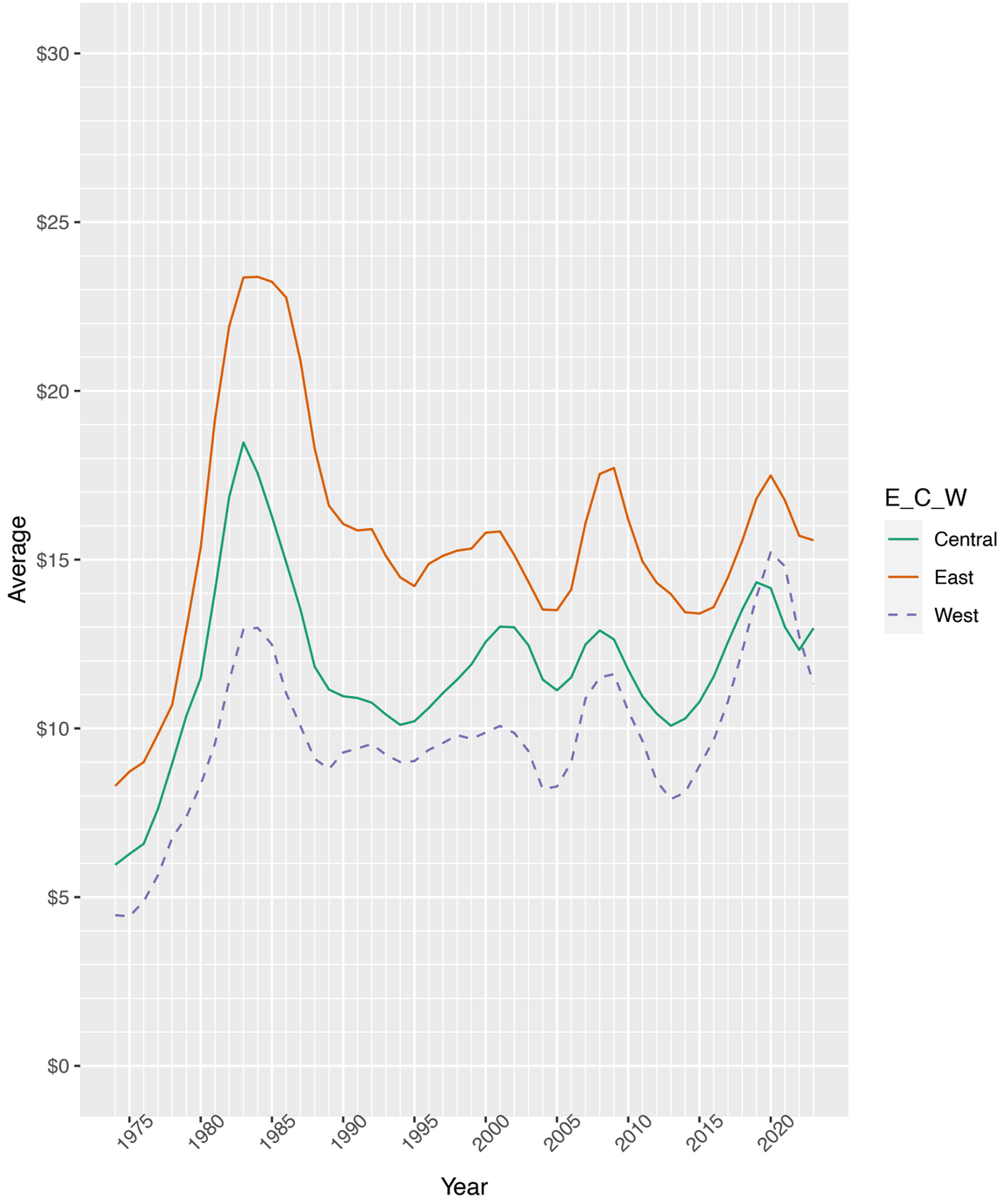
Balance sheets are strong

- Rising land values contribute to higher equity
- D/A ratios are strong
  - D/A ratio is a lagging indicator of farm troubles
- Masked in this graph is the increase in debt

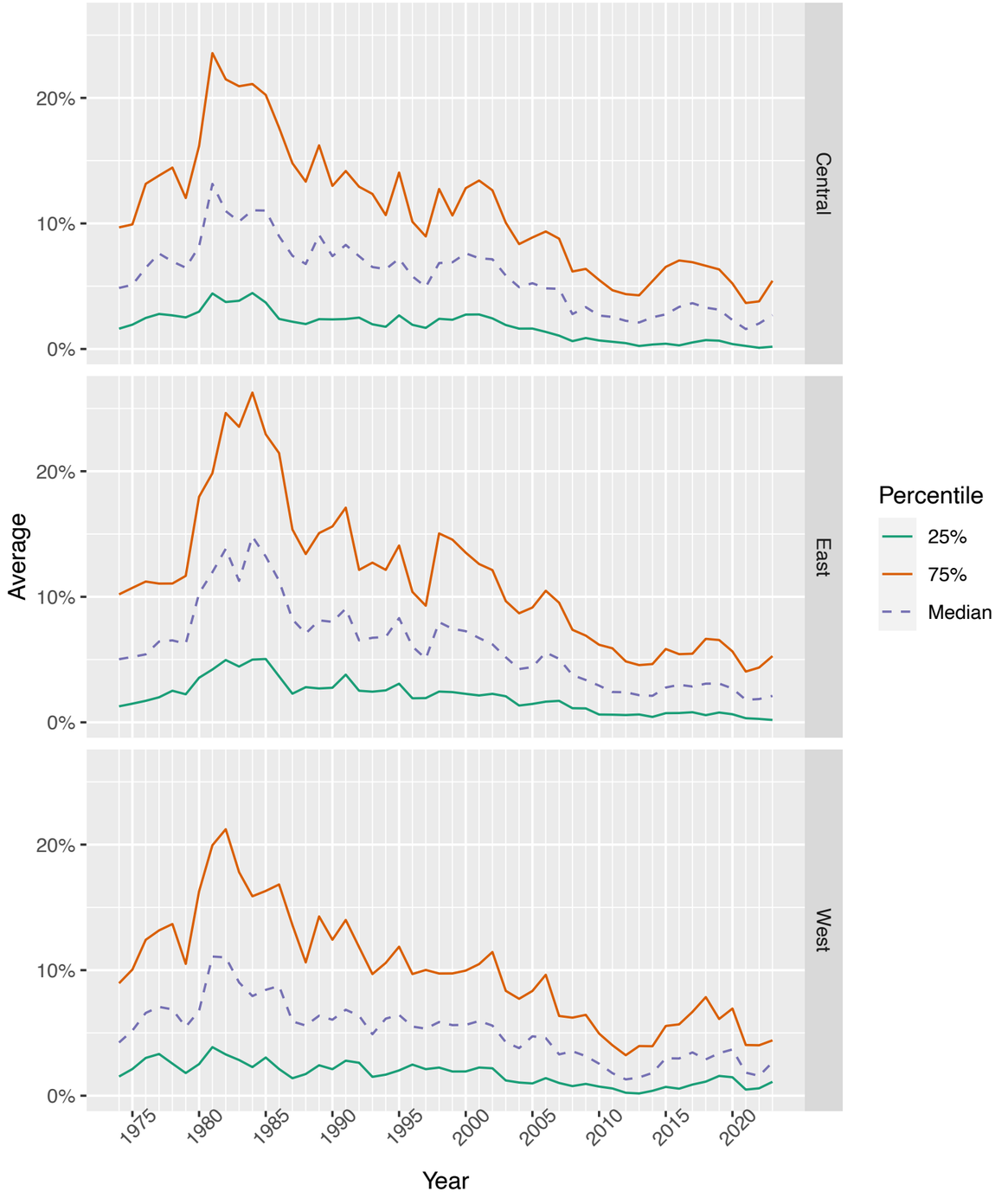

Kansas Debt/Asset Ratio
50%
40%
30%
20%
10%
0%
Average
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
Year
E_C_W
Central
East
West

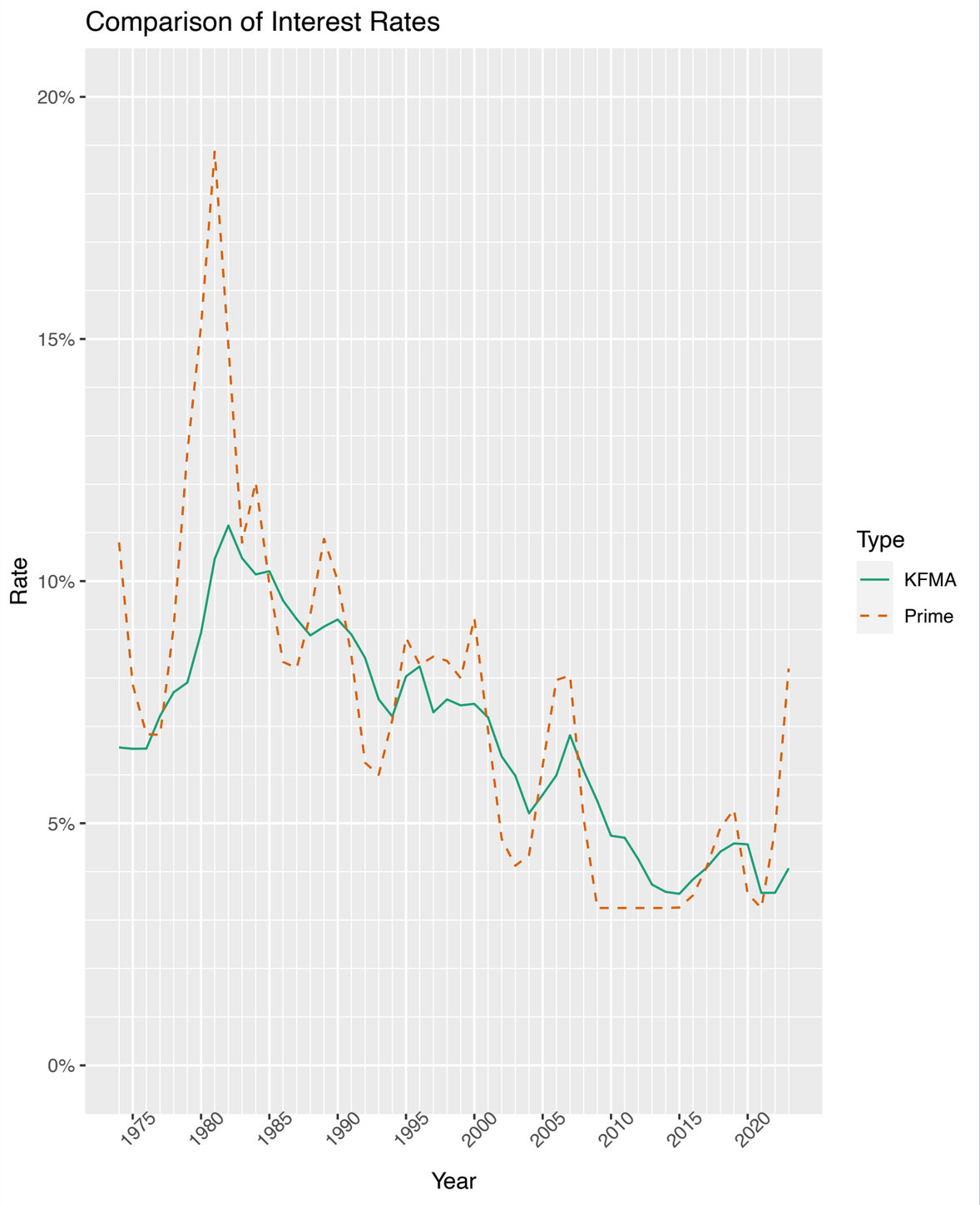

Kansas Farm Debt per Crop Acre
$400
$350
$300
$250
$200
$150
$100
$50
$0
Average
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
Year
E_C_W
Central
East
West

Kansas Farm Interest per Crop Acre



Interest Expense Ratio by Region





Interest rates paid by farmers are relatively low

- This is across all debt
- Increase in overall rate the last 2 years as short-term rates increase
- At what point do rates and interest become a problem?

Questions?

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