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Does the Bias in Early Season Crop Condition Ratings for Corn and Soybeans Vary with the Magnitude of the Ratings?

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The strong start to the growing season, as indicated by 79 percent of the U.S. corn crop and 73 percent of U.S. soybean crop rated in good or excellent condition on June 18, has many market observers predicting large yields. Previous *farmdoc daily* articles (May 24, 2017; June 1, 2017; June 13, 2018; June 14, 2018) have emphasized a pattern of bias that is particularly pronounced early in the growing season and the overall limited information these early season crop condition ratings provide. However, the analysis of bias in early season ratings was unconditional. That is, the average bias was computed for all years in the sample without regard to whether the early season ratings were especially high or low. It is possible that the change in the ratings (bias) depends on the starting level of the ratings. The purpose of this article is to analyze the bias in early season crop condition ratings for corn and soybeans conditional on the initial magnitude of the ratings.

Analysis

We begin by analyzing the first and last observations for the crop rated in good or excellent condition for corn and soybeans in each crop year available over 1986 through 2017. Table 1 shows the first and last ratings for each crop year and the difference between the two observations. We sort the observations based on the magnitude of the first rating of the season. Note that in the sorting we keep the first and last observations for a given year paired. For instance, the highest first rating for corn occurred in 1991 at 81 percent rated good to excellent. The final rating in 1991 came in at 53 percent leading to a 28 percent point decrease for the year. We then group the observations into thirds based on the magnitude of the first rating in the season. Since there are 32 years in the sample, the top third contains 10 observations, the middle third 11 observations, and the bottom third 11 observations. Arranging the data in this manner allows us to track the average change in condition ratings across a season based on the magnitude of the first rating of the season. The rows at the bottom of Table 1 show the averages of the good and excellent rating observations by thirds as well as the averages across all observations in the sample.

Table 1. Change in Good + Excellent Crop Condition Ratings for U.S Corn Based on Magnitude of First Rating of the Year, 1986-2017

	Corn				Soybeans		
	Good + Excellent Rating				Good + Excellent Rating		
Year	First	Last	Change	Year	First	Last	Change
1991	81	53	-28	2010	75	64	-11
1994	79	86	7	2014	74	73	-1
1987	78	83	5	2016	72	62	-10
2007	78	65	-13	2007	71	58	-13
2012	77	25	-52	1998	70	61	-9
1998	76	69	-7	1999	70	44	-26
2014	76	74	-2	2006	70	62	-8
1999	75	60	-15	2015	69	64	-5
2015	74	68	-6	1991	68	49	-19
2001	72	58	-14	1994	68	79	11
2016	72	74	2	2011	67	56	-11
1986	71	84	13	2000	66	54	-12
1992	71	80	9	2003	66	38	-28
2004	71	75	4	2009	66	63	-3
2000	70	63	-7	2017	66	61	-5
2009	70	67	-3	1987	65	64	-1
2003	68	53	-15	2004	65	66	1
2010	67	68	1	2012	65	37	-28
2006	66	63	-3	2013	64	57	-7
2017	65	66	1	1986	63	61	-2
1988	64	19	-45	2005	62	57	-5
1989	64	66	2	1997	61	61	0
2005	63	57	-6	2001	61	54	-7
2008	63	64	1	2002	60	45	-15
2011	63	54	-9	1990	58	56	-2
2013	63	62	-1	1995	58	46	-12
1995	60	52	-8	1996	58	60	2
1997	60	64	4	2008	57	57	0
1990	51	75	24	1989	55	53	-2
1993	51	45	-6	1993	55	47	-8
1996	51	66	15	1992	51	79	28
2002	43	44	1	1988	32	23	-9
Averages:							
Top Third	76.6	64.1	-12.5		70.7	61.6	-9.1
Middle Third	68.6	64.7	-3.9		65.0	55.8	-9.2
Bottom Third	57.5	59.0	1.5		55.1	52.8	-2.3
All Years	67.3	62.6	-4.7		63.4	56.6	-6.8

The results in Table 1 show that the change in corn ratings has a marked tendency to decrease when the ratings begin the year at a high level, with the top third of initial corn ratings averaging a decrease of 12.5 points. This compares to an average decrease in corn ratings across all years of 4.7 points. The largest change was in 2012, when good plus excellent ratings dropped a whopping 52 points. It is also noteworthy how consistent the drop in ratings is for years in the top third of highest initial ratings, with ratings for corn decreasing in 8 out 10 years. The two years with high initial ratings and even higher final ratings were 1987 and 1994. The middle third of crop condition ratings show an average 3.9 point decrease from the first rating, slightly lower than the average decrease for all years (4.7 points). The bottom third (or lowest initial ratings) indicate a 1.5 percent increase on average in the good to excellent ratings during the crop year.

Soybean crop condition ratings decrease on average over the crop year regardless of initial rating level. Both the top and middle third of initial soybean ratings decline on average over 9 points during the year and only one year, 2004, witnessed an increase in good and excellent conditions. By comparison, the average change in soybean ratings during the year for the entire period is a decline of 6.8 points. The bottom third of ratings average a 2.3 point decline over the year with 1992 standing out at a 28 percent increase.

To provide a comparison between the most recent crop conditions report and historical data, Table 2 provides a similar analysis in ranking the good and excellent crop conditions by initial magnitude but ratings for the most recent week (#24) are instead of the first crop condition rating. If week #24 ratings are unavailable for soybeans, the initial rating is used as a substitute. For both corn and soybeans, only five of the years ranked in the top third using first week ranking were still in the upper third by week #24. Despite the shift in rankings, the change in corn ratings continue to show pattern of decreasing ratings when the conditions in week #24 are at a high level. The top third of initial corn ratings average a decrease of 5 points, close to the average decrease in corn ratings across all years of 4.6 points. Week #24 ratings in the top third decrease 70 percent of the time. The middle third of crop condition ratings show an average of a 5.4 point decrease from the week #24 rating, while the bottom third (or lowest initial ratings) indicate a 3.5 percent decrease on average in the good to excellent ratings.

Table 2. Change in Good + Excellent Crop Condition Ratings for U.S Corn Based on Magnitude of Week #24 Rating, 1986-2017

Corn				Soybeans			
	Good + Excellent Rating				Good + Excellent Rating		
Year	Week #24	Last	Change	Year	Week #24	Last	Change
1987	82	83	1	2016	73	62	-11
1986	80	84	4	2014	73	73	0
1991	78	53	-25	2010	69	64	-5
1994	77	86	9	1999	69	44	-25
2014	76	74	-2	2011	68	56	-12
1999	75	60	-15	2004	68	66	-2
2010	75	68	-7	2003	68	38	-30
2016	75	74	-1	2000	68	54	-14
2015	73	68	-5	1994	68	79	11
2000	72	63	-9	1991	68	49	-19
2003	71	53	-18	2017	67	61	-6
1998	70	69	-1	2015	67	64	-3
2004	70	75	5	2006	67	62	-5
2007	70	65	-5	1998	67	61	-6
2009	70	67	-3	2009	66	63	-3
2011	70	54	-16	2007	65	58	-7
2005	68	57	-11	1987	65	64	-1
2006	68	63	-5	2013	64	57	-7
2017	67	66	-1	2005	63	57	-6
1997	66	64	-2	1986	63	61	-2
2013	64	62	-2	2002	62	45	-17
1989	63	66	3	1997	61	61	0
1990	63	75	12	2001	58	54	-4
2001	63	58	-5	1996	58	60	2
2012	63	25	-38	1995	58	46	-12
2002	62	44	-18	1990	58	56	-2
1995	60	52	-8	2012	56	37	-19
1993	57	45	-12	2008	56	57	1
2008	57	64	7	1989	55	53	-2
1996	56	66	10	1993	54	47	-7
1992	52	80	28	1992	51	79	28
1988	37	19	-18	1988	23	23	0
Averages:							
Top Third	76.3	71.3	-5.0		69.2	58.5	-10.7
Middle Third	68.5	63.2	-5.4		65.1	59.4	-5.7
Bottom Third	57.5	54.0	-3.5		53.5	52.1	-1.4
All Years	67.2	62.6	-4.6		62.4	56.6	-5.8

Note: Crop condition ratings for soybeans were not available in four years (1986, 1995, 1996, and 1997) for soybeans in week #24. First condition ratings in those years were substituted.

The results in Table 2 show that soybean crop condition ratings once again decrease on average from the week #24 rating over the crop year regardless of initial rating level. The decrease for the top third of years is 10.7 points, substantially larger than the average of 5.8 points for all years. The middle third of years average a decrease of 5.7 points while the bottom third of ratings average a 1.4 point decline.

In our previous *farmdoc daily* articles (May 24, 2017; June 1, 2017; June 13, 2018; June 14, 2018) related to crop condition ratings, we found a structural change in bias associated with the early season crop season ratings for both corn and soybeans after 1999. It is possible that this structural change in the bias across all years carries over to the highest and lowest initial ratings. Table 3 provides an analysis using first and last observations of corn and soybean good and excellent crop ratings from 1999 – 2017. The period is once again separated into thirds based on the magnitude of the first rating of the crop year. The top third of corn ratings averages an even larger 17 point decline in the truncated sample, consistent with the larger overall bias after 1999. Furthermore, the highest third of first good to excellent ratings for corn decrease in 6 out 6 years. The average change in corn ratings over the crop year for the all years over 1999-2017 is 7.2 points lower. Soybean crop condition ratings in the truncated sample decrease on average over the crop year regardless of initial rating level and only one year, 2004, indicates an increase in ratings over the crop year. The top third of soybean ratings decline on average 11.5 points. The middle third of ratings declines on average by 10.7 points by the end of the crop year and the bottom third of ratings average an 8.7 point decline over the year.

Table 3. Change in Good + Excellent Crop Condition Ratings for U.S Corn Based on Magnitude of First Rating of the Year, 1999-2017

	Corn Good + Excellent Rating				Soybeans Good + Excellent Rating		
Year	First	Last	Change	Year	First	Last	Change
2007	78	65	-13	2010	75	64	-11
2012	77	25	-52	2014	74	73	-1
2014	76	74	-2	2016	72	62	-10
1999	75	60	-15	2007	71	58	-13
2015	74	68	-6	1999	70	44	-26
2001	72	58	-14	2006	70	62	-8
2016	72	74	2	2015	69	64	-5
2004	71	75	4	2011	67	56	-11
2000	70	63	-7	2000	66	54	-12
2009	70	67	-3	2003	66	38	-28
2003	68	53	-15	2009	66	63	-3
2010	67	68	1	2017	66	61	-5
2006	66	63	-3	2004	65	66	1
2017	65	66	1	2012	65	37	-28
2005	63	57	-6	2013	64	57	-7
2008	63	64	1	2005	62	57	-5
2011	63	54	-9	2001	61	54	-7
2013	63	62	-1	2002	60	45	-15
2002	43	44	1	2008	57	57	0
Averages:							
Top Third	75.3	58.3	-17.0		72.0	60.5	-11.5
Middle Third	69.7	66.7	-3.0		66.7	56.0	-10.7
Bottom Third	60.9	58.6	-2.3		62.0	53.3	-8.7
All Years	68.2	61.1	-7.2		66.6	56.4	-10.2

Implications

After a rocky start in April, the U.S. growing season for corn and soybeans in 2018 has since gone about as well as one could hope. This is reflected in historically high crop condition ratings and considerable discussion about the potential for record yields. The analysis in this article suggests that some of the enthusiasm about yield potential may need to be tempered. We analyzed the average change across the season in good plus excellent condition ratings for corn and soybeans based on the level of early season ratings. Corn ratings have a marked tendency to decrease when the ratings begin the year at a high level, with the top third of initial corn ratings averaging a decrease of 12.5 points. The decline is also

consistent, with ratings for corn in the top third of years decreasing 80 percent of the time. Both the top and middle third of initial soybean ratings decline an average of 9 points, and only one year in these 2 groups witnessed an increase in good and excellent conditions.

In sum, history suggests there is a strong probability that the high corn and soybean ratings of recent weeks will decline as we go through the remainder of the 2018 growing season. A conservative estimate of the magnitude of the decline is 5-10 points for both corn and soybeans. There is, of course, a chance for ratings to stay at current elevated ratings or even increase. This has happened a few times in the past, such as 1987 and 1994 for corn. However, the chance of this happening is low because the odds of having excellent weather conditions for an entire growing season in the U.S. Corn Belt are low.

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