



Weekly Farm Economics: Adverse Corn and Soybean Price Scenarios for 2020 and 2021

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Prospects are that soybean prices will continue to be low over the next several years, leading to a period of lower farm incomes. Even given those prospects, prices could go even lower causing more financial stress to develop. Herein, we present an adverse set of prices that could plausibly occur but are not likely to occur. These prices are developed for a specific supply/demand situation using a scenario model developed at the University of Illinois for Compeer Financial. Farmers and others may wish to use these adverse prices in pro forma cash flows to analyze stress that could result.

Background

Stress testing agricultural portfolios is a process that many agricultural lenders go through, partly to understand risks that their borrowers face and partly to ensure the lender themselves have adequate capital to sustain lending and continue to serve agriculture should unexpected stressful events occur. When stress testing, an adverse set of prices and yields are created to stress incomes. This set of prices and yields then are used to see how borrowers will fare under different modeling assumptions.

Herein, we present a scenario of baseline prices that are "likely" to happen the next several years barring any unforeseen events (e.g., weather disruption). This baseline may even be viewed by some as optimistic in context of the current markets. Keep in mind that this baseline represents only one set of "likely" prices out of a range of "likely" outcomes and a large degree of uncertainty remains, particularly, given the current growing and trade situation. Also presented is an adverse set of prices, which represents an adverse event that is plausible but unlikely. This scenario is built using the Compeer Agricultural Scenario Builder, a model that is used to build a set of adverse set of prices for stress testing agricultural loans.

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This scenario of prices is unlikely, and will result in deterioration of financial performance. However, farmers may wish to construct cash flows and pro forma financial statements around this scenario. Planning actions that would be taken if adverse conditions do result is part of good risk management.

Baseline and Adverse Scenarios

Baseline and adverse corn and soybean prices for 2019 through 2021 are shown in Table 1. For 2018, average farm prices for the nation are \$3.60 for corn and \$8.50 for soybeans. These are the same prices reported by U.S. Department of Agriculture (USDA) in the August 2019 World Agricultural Supply and Demand Estimates (WASDE) and represent prices for the 2018/2019 marketing year, which runs from September to August for both corn and soybeans. The 2018 marketing year is not complete, but those likely will be very close to the ending values.

	Marketing Year			
	2018/19	2019/20	2020/21	2021/22
Panel A. Corn Prices				
Baseline	\$3.60	\$4.00	\$3.80	\$3.75
Adverse		\$3.41	\$3.07	\$3.02
Panel B. Soybean Prices				
Baseline	\$8.50	\$8.70	\$8.76	\$8.85
Adverse		\$8.30	\$7.90	\$7.56

Baseline price for corn are \$4.00 per bushel for corn in 2019/20, \$3.80 in 2020/21, and \$3.75 per bushel for 2021/22. The beginning point for these baselines is a combination of the USDA August 2019 WASDE as well as the long-run USDA Outlooks released in February of 2019. From there, several adjustments are made that result in deviations from both forecasts. The largest adjustments on the corn side are to assume lower harvested acres and lower yields than the August USDA WASDE. This reduction in supply results in a 2019/20 higher corn price forecast than USDA. These adjustments have been made to reflect realizations of 2019 growing and market conditions. The baseline of the out-years then adjust because they are influenced in the model by the prior year. The adverse set of prices is \$3.41 in 2019/20, \$3.07 in 2020/21 and \$3.02 in 2021/22.

Baseline prices for soybeans are \$8.70 for soybeans in 2019/20, \$8.76 in 2020/21 and \$8.85 in 2021/22. On the soybean side, a price adjustment is made to reflect a 2019/20 higher soybean price forecast than current USDA figures. The out-years then adjust as well. The adverse scenario is \$8.30 for 2019/20, \$7.90 for 2021/21 and \$7.56 in 2021/22. The supply and demand scenario that potentially results in these prices is given in the following section.

Again, the adverse scenario is not likely, but it is plausible. Somewhat sobering, baseline prices, particularly for soybeans, can be viewed as stressful in itself.

Economic Conditions Resulting in Adverse Scenario

The set of adverse prices shown in Table 1 are built around the following supply/demand scenario:

- The U.S. economy weakens, leading to a mild recession. This mild recession causes sluggish demand for meats and other products, resulting in lower use of both corn and soybeans.
- Ethanol demand stagnates, leading to reduced demand for corn.
- The full extent of African Swine Fever becomes known in China and it is large. As a result, soybean exports to China fall, and rebuilding is very slow.

- Trade relations between U.S., China, and other nations continue to be strained, leading to a continuation of tariffs on soybean exports from the U.S. to China.

Again, this is a plausible, though unlikely, scenario.

The implications of this supply and demand situation on price are shown in Table 2. This is the corn scenario page from the Compeer Agricultural Scenario Builder. There are two sets of columns: one for the baseline and one for an “adverse” scenario. Rows closely match supply and use sheets produced by the USDA. Rows first give assumptions about acres harvested and yield per acre. Then sources of supply are given: beginning stock, production, and imports. Then uses are given: feed and residual, food, seed, and industrial, and exports. Subtracting supplies from use then gives ending stock.

	2018/19	Baseline			Adverse		
		2019/20	2020/21	2021/22	2019/20	2020/21	2021/22
Standard Deviation Shock					-0.75	0.0	0.50
Area Harvested (mil./acres)	81.7	80.4	87.6	86.6	82.0	87.6	85.6
Yield per acre (bu./acre)	176.4	166.0	178.5	180.5	169.5	179.5	181.5
		Million (bu)			Million (bu)		
Beginning Stocks	2,140	2,360	1,630	2,005	2,360	2,480	3,285
Production	14,420	13,350	15,640	15,630	13,900	15,720	15,540
Imports	30	50	50	50	50	50	50
Total Supply	16,590	15,760	17,320	17,685	16,310	18,250	18,875
Feed and Residual	5,275	5,175	5,650	5,775	5,125	5,550	5,700
Food, Seed & Industrials	6,855	6,905	7,215	7,215	6,805	7,065	7,115
Ethanol & by-products	5,425	5,475	5,725	5,725	5,375	5,575	5,625
Exports	2,100	2,050	2,450	2,475	1,900	2,350	2,400
Total Use	14,230	14,130	15,315	15,465	13,830	14,965	15,215
Ending Stocks	2,360	1,630	2,005	2,220	2,480	3,285	3,660
Stocks / Use	16.6%	11.5%	13.1%	14.4%	17.9%	22.0%	24.1%
Consumption / Production	98%	105%	98%	99%	99%	95%	98%
Avg Farm Price (\$/bushel)	\$3.60	\$4.00	\$3.80	\$3.75	\$3.41	\$3.07	\$3.02

An average price is reported at the bottom of the table. This price is estimated by the model based on an econometrically fitted relationship from historical prices. A price for a given year depends on the lagged price and ending stocks over use. An increase in stocks over use will result in lower prices and vice versa.

The baseline scenario starts with the USDA August 2019 WASDE and the USDA long-run outlook (released February 2019). From there, modifications have been made to reflect 2019 growing and market conditions as described above.

The adverse scenario includes supply and demand conditions reflecting the supply/demand conditions listed above. Those changes are highlighted in red:

- Acres harvested are higher in the adverse scenario in 2019/20 as compared to the baseline creating stronger supplies than expected in 2019. (82.0 versus 80.4 million acres) Acres

harvested are slightly lower in the adverse scenario in 2021/22 as compared to the baseline with low prices assumed to take some acreage out of production. (85.6 versus 86.6 million acres)

- Yields in all three years are higher in the adverse scenario as compared to the baseline (169.5 versus 166.0 bushels per acre in 2019/20, 179.5 versus 178.5 per acre in 2020/21 and 181.5 versus 180.5 per acre in 2021/22)
- Feed and residual are reduced in all three years to reflect a recession in the U.S. (5,125 versus 5,175 in 2019/20, 5,550 versus 5,650 million bushels in 2020/21 and 5,700 million bushels versus 5,775 in 2021/22).
- Ethanol demand is reduced in all three years (5,375 versus 5,475 million bushels in 2019/20, 5,575 versus 5,725 million bushels in 2020/21 and 5,625 versus 5,725 million bushels in 2021/22).
- Exports are reduced to reflect continuing trade difficulties (1,900 versus 2,050 million bushels in 2019/20, 2,350 versus 2,450 million bushels in 2021/22 and 2,400 versus 2,475 million bushels in 2021/22).

All of those changes will result in lower prices. In addition, a -0.75 standard deviation shock is placed on 2019/20 and a 0.50 standard deviation shock is placed on the 2021/22 price (see first line of Table 2). The fitted relationship estimates the price. Based on historical prices, the price for 2019/20 is -0.75 standard deviations from the expected price, and the price for 2021/22 is 0.50 standard deviations from the expected price as we would not expect the price to go below \$3.00/bushel.

Table 3 shows a similar output for soybeans. Changes made to this scenario from the baseline are:

- Acres harvested are slightly lower in the adverse scenario in 2021/22 as compared to the baseline with low prices assumed to take some acreage out of production. (81.8 versus 82.2 million acres)
- Yield per acres is increased in 2020/21 and 2021/22 (52.6 versus 50.6 bushels per acre in 2020/21 and 52.1 versus 51.1 bushels per acre in 2021/22).
- Crushing was reduced (2,065 versus 2,115 million bushels in 2019/20, 2,050 versus 2,100 million bushels in 2020/21 and 2,080 versus 2,120 million bushels in 2021/22).
- Exports were reduced in all years (1,625 versus 1,775 million bushels in 2019/20, 1,700 versus 2,000 million bushels in 2020/21, and 1,900 versus 2,000 million bushels in 2021/22).

Again, all those changes result in reduced prices.

Table 3. Baseline and Adverse Scenarios for Soybeans

	2018/19	Baseline			Adverse		
		2019/20	2020/21	2021/22	2019/20	2020/21	2021/22
Standard Deviation Shock					0.0	0.0	0.0
Area Harvested (mil/acres)	88.1	75.9	81.8	82.3	75.9	81.8	81.8
Yield per acre (bu./acre)	51.6	48.5	50.6	51.1	48.5	52.6	52.1
		Million (bu)			Million (bu)		
Beginning Stocks	438	1,070	755	692	1,070	954	1,401
Production	4,544	3,680	4,140	4,210	3,680	4,300	4,260
Imports	17	20	25	25	20	25	25
Total Supply	4,999	4,771	4,920	4,927	4,770	5,279	5,686
Crushing	2,065	2,115	2,100	2,120	2,065	2,050	2,080
Exports	1,700	1,775	2,000	2,000	1,625	1,700	1,900
Seed and Residual	164	126	128	129	126	128	129
Total Use	3,929	4,016	4,228	4,249	3,816	3,878	4,109
Ending Stocks	1,070	755	692	678	954	1,401	1,577
Stocks / Use	27.2%	18.8%	16.4%	16.0%	25.0%	36.1%	38.4%
Consumption / Production	86%	109%	102%	100%	103%	90%	96%
Avg Farm Price (\$/bushel)	\$8.50	\$8.70	\$8.76	\$8.85	\$8.30	\$7.90	\$7.56

Summary and Commentary

Stress testing, not only from a lender's perspective, but also from a farmer's perspective can provide a better understanding of risks. A better understanding of the potential outcomes of these risks can help in planning and managing should they occur.

The adverse scenario arguably takes an already stressed outlook and adds further adversity. A series of stressful events, including U.S. recession, further export disruptions and supply/demand imbalances, was assumed in the above to create a scenario resulting in several years of sustained adverse prices. While this scenario is not likely, it is based on a plausible set of assumptions. Farmers and others may want to use these adverse prices in pro forma cash flows to analyze the stress that could result.

Note that the prices presented in both the baseline and adverse scenarios make no assumptions around Market Facilitation Payments (MFP). Similar to 2018, MFP payments will be a significant component of incomes in 2019. Without MFP payments, incomes are low even under baseline conditions. While the current trade situation results in very low prices, a continuation of MFP payments in 2020 could soften adverse financial results caused by lower prices.

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