

Projected Crop Market and Tennessee Farm Income Impacts From the COVID-19 Pandemic

*S. Aaron Smith, Associate Professor
Burton C. English, Professor
R. Jamey Menard, Research Leader
David W. Hughes, Professor and Greever Chair in Agribusiness
Kimberly L. Jensen, Professor
Department of Agricultural and Resource Economics*

Background and Study Purpose

The COVID-19 pandemic has affected all aspects of agricultural commodity production and distribution. Substantial price declines have been experienced for Tennessee row crops, specialty crops, livestock and dairy producers. The 2019 crop's price declines in Tennessee for corn, soybean, cotton and wheat from January 2 to the end of each crop's 2019/20 marketing year are analyzed in this paper. Additionally, estimates of the federal aid issued to producers through Coronavirus Food Assistance Program (CFAP) direct payments are provided.

Data Sources and Methods

Prices

Expected prices assuming no COVID-19 outbreak, actual prices (January 15-May 31) and projected prices (June 1 to the end of each commodity's marketing year) are compared and analyzed for four Tennessee row crops. Expected monthly Tennessee prices without COVID-19 are estimated as the 10-year average (2009/10 to 2018/19; USDA-NASS, 2020) price increase (or decrease) relative to January plus the January 2020 price (represented as the blue dotted line in **Figures 1-4**). Take corn for example — the 10-year average price was \$0.16/bu greater in February than in January. So, the expected price without COVID-19 for corn in February 2020 is the average price for corn in January 2020 (\$4.02) plus \$0.16 or \$4.18. This process is repeated for all remaining months in each commodity's marketing year to obtain the monthly expected price without COVID-19.

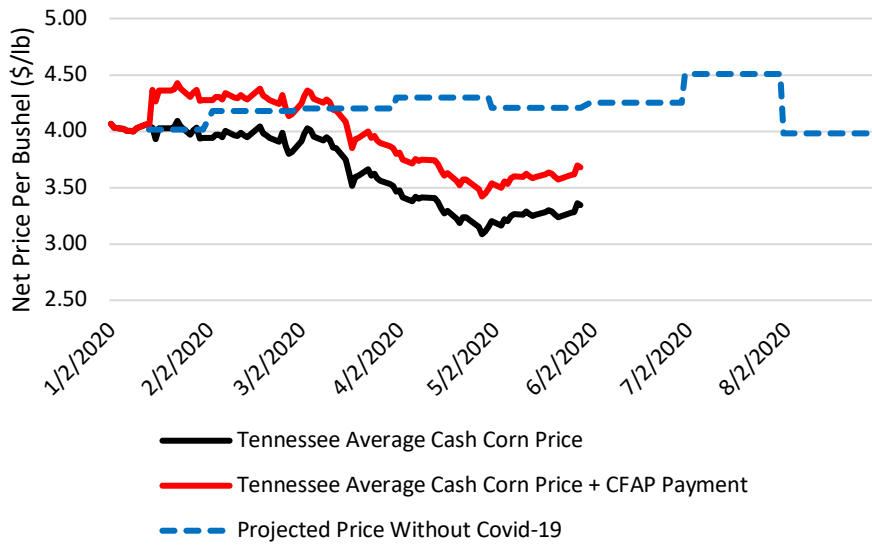


Figure 1. Average Tennessee Cash Corn Price at Elevators and Barge Points With and Without CFAP Payments, January 2-May 29, 2020.

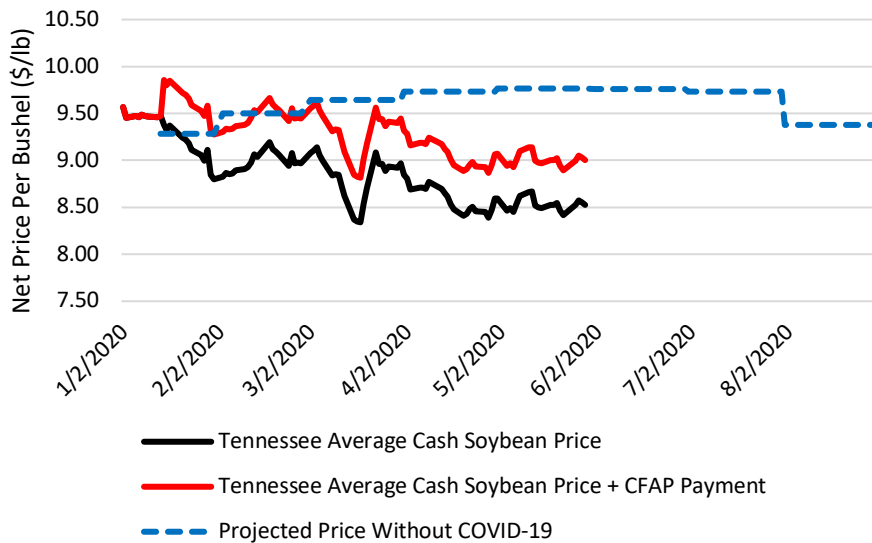


Figure 2. Average Tennessee Cash Soybean Price at Elevators and Barge Points With and Without CFAP Payments, January 2-May 29, 2020.

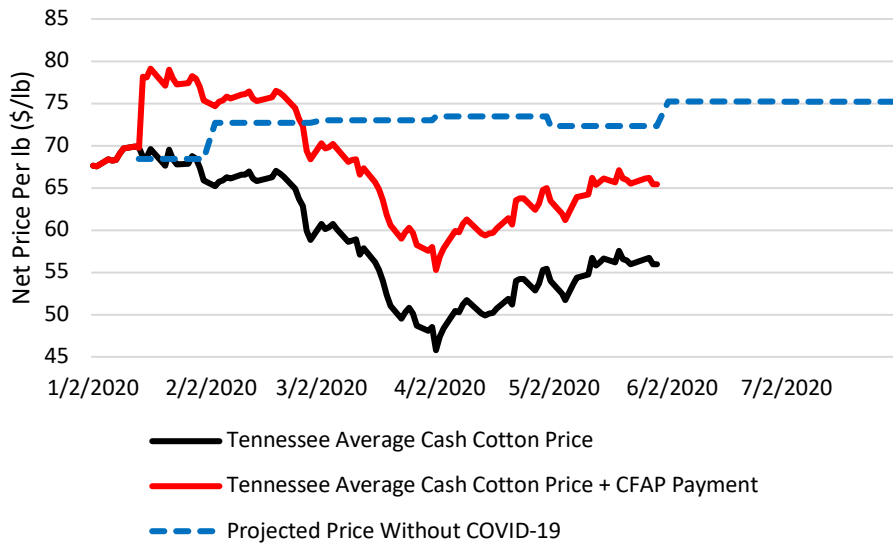


Figure 3. Average Tennessee Cash Cotton Price (North Delta) With and Without CFAP Payments, January 2-May 29, 2020.

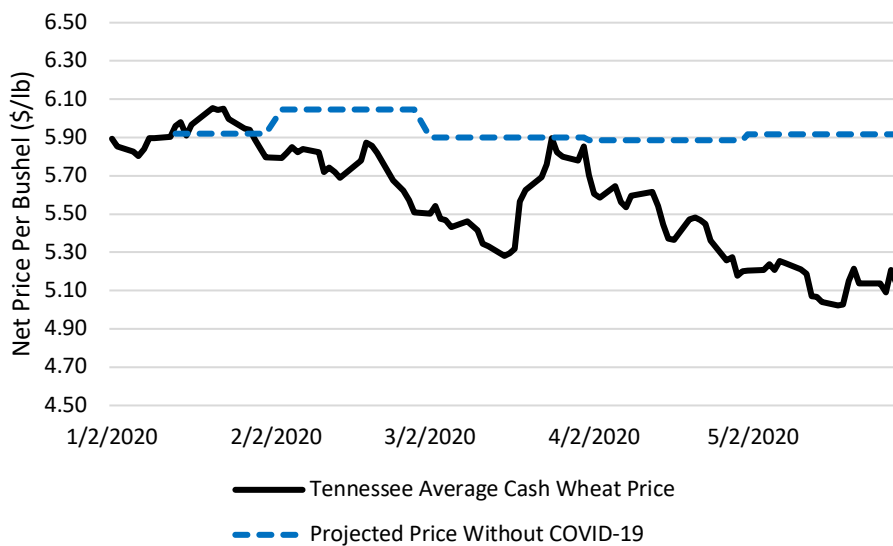


Figure 4. Average Tennessee Cash Wheat Price at Elevators and Barge Points, January 2-May 29, 2020.

Actual average daily spot prices from Tennessee elevators and barge points were collected for corn, soybeans and wheat from January 2 to May 29, 2020 (black line in **Figures 1, 2 and 4**; USDA-AMS, 2020). Average daily spot prices for North Delta upland cotton were also collected (black line in **Figure 3**; USDA-AMS, 2020a). Using the daily data, average monthly spot prices are calculated for January through May. The difference between the average monthly spot price and the expected price without COVID-19 is shown in **Table 1**. The average price difference in May is assumed for the remainder of the months in each commodity’s marketing year (June and July for cotton; June, July and August for corn and soybeans; wheat’s marketing year ended May 31).

Table 1. Estimated Monthly Average Price Decline Due to COVID-19: Tennessee Cash Price (Old Crop) Less Projected Price Without COVID-19

	Corn	Soybean	Cotton	Wheat
January	(0.01)	(0.15)	(0.00)	0.03
February	(0.24)	(0.52)	(0.08)	(0.30)
March	(0.45)	(0.81)	(0.18)	(0.35)
April	(1.00)	(1.14)	(0.22)	(0.42)
May	(0.94)	(1.23)	(0.17)	(0.76)
Remainder of the Marketing Year	(0.94)	(1.23)	(0.17)	(0.77)

CFAP payments on inventory held as at January 15 were \$0.335/bu, \$0.475/bu, \$0.095/lb and \$0/bu for corn, soybeans, cotton and wheat (USDA-FSA, 2020).¹ The CFAP payments are added to the actual daily price to determine the net price received by producers (red line in **Figures 1, 2 and 3**). Monthly average prices with CFAP payments are calculated from January to May. Average monthly price losses (expected price without COVID-19 and actual monthly prices plus CFAP payments) were estimated and are equal to the values in **Table 1**, plus the corresponding commodity’s CFAP payment rate.

A caveat for this analysis is that price reactions to one event do not happen in a vacuum; numerous factors simultaneously impact commodity prices. As such, assigning all of the price decline to COVID-19 may be incorrect. This analysis does not attempt to separate the price declines that can be attributed to COVID-19 versus other market factors.

Inventory

To estimate inventory as of January 15 and monthly sales by commodity, USDA-NASS production estimates for Tennessee and USDA-ERS monthly marketing weights are used (USDA-NASS, 2020a; USDA-ERS, 2020). **Table 2** shows 2019 Tennessee production, estimated inventory as of January 15, and estimated monthly sales to the end of each commodity's marketing year. Half of January sales are estimated to occur after January 15. No inventory is assumed to be carried into the next marketing year.

Table 2. Estimated Monthly Sales of Old Crop Corn, Soybean, Cotton and Wheat in Tennessee

	Corn (bu)	Soybean (bu)	Cotton (lb)	Wheat (bu)
Total 2019 Production	161,070,000	64,390,000	460,800,000	14,405,000
Estimated Inventory as of Jan. 15	86,655,660	25,434,050	176,947,200	3,269,935
		Estimated Monthly Sales		
January (after Jan. 15)	10,147,410	4,442,910	42,393,600	590,605
February	12,080,250	4,571,690	44,236,800	720,250
March	11,113,830	3,863,400	33,177,600	749,060
April	9,503,130	3,026,330	22,118,400	605,010
May	10,147,410	2,253,650	12,902,400	605,010
Remainder of the Marketing Year	33,663,630	7,276,070	22,118,400	-
Total Sold to End of Marketing Year	86,655,660	25,434,050	176,947,200	3,269,935

* Marketing year ends May 31 for wheat, July 31 for cotton, and August 31 for corn and soybeans.

Estimated Price Loss and Reduction in Producer Income

The decline in producer income is estimated with and without CFAP payments (**Table 3**). Monthly declines in producer income without CFAP payments are estimated by multiplying the monthly price loss (**Table 1**) and monthly sales (**Table 2**). Producer income declines with CFAP payments are calculated as the CFAP payment rate plus the monthly price decline multiplied by the monthly sales quantity.

Without CFAP payments, Tennessee corn, soybean, cotton and wheat producers are estimated to have declines in income of \$58.8 million, \$21.4 million, \$20.3 million and \$1.2 million, respectively (a total decline of \$101.6 million in producer income).

With CFAP payments, the estimated losses are partially mitigated, and corn, soybean and cotton producer income declines are reduced to \$29.8 million, \$9.3 million and

\$3.4 million, respectively (a total decline of \$43.7 million in producer income). In general, sales of inventory between January 15 and February 28 received CFAP compensation exceeding estimated price losses. These sales occurred before the full impact of COVID-19 on commodity prices was realized. After March 1, even with CFAP payments, producers do not offset the price or income declines.

Table 3. Estimated Decline in Gross Revenue for Tennessee Corn, Soybean, Cotton and Wheat Producers Due to COVID-19, With and Without CFAP Payments

Without CFAP Payments				
	Corn	Soybean	Cotton	Wheat
January	(96,525)	(650,146)	(94,023)	18,685
February	(2,845,115)	(2,386,662)	(3,342,395)	(216,304)
March	(4,989,364)	(3,133,246)	(6,000,033)	(261,437)
April	(9,517,540)	(3,446,632)	(4,880,056)	(255,919)
May	(9,582,060)	(2,775,751)	(2,187,757)	(461,832)
Remaining Inventory	(31,788,105)	(8,961,710)	(3,750,441)	-
Total	(58,818,709)	(21,354,148)	(20,254,705)	(1,176,808)
With CFAP Payments				
	Corn	Soybean	Cotton	Wheat
January	3,302,858	1,460,236	3,933,369	18,685
February	1,201,769	(215,110)	860,101	(216,304)
March	(1,266,231)	(1,298,131)	(2,848,161)	(261,437)
April	(6,333,991)	(2,009,125)	(2,778,808)	(255,919)
May	(6,182,678)	(1,705,267.16)	(962,029)	(461,832)
Remaining Inventory	(20,510,789)	(5,505,577)	(1,649,193)	-
Total	(29,789,063)	(9,272,974)	(3,444,721)	(1,176,808)

Conclusions and Limitations

The COVID-19 pandemic has placed significant downward pressure on agricultural commodity prices. This analysis projects the decline in Tennessee corn, cotton, soybean and wheat producer income for the 2019 crop marketed between January 15 and the end of the commodities' marketing year. The estimated decline in producer income due to the COVID-19 commodity market impacts is \$101.6 million without CFAP payments. This decline in income is reduced to \$43.7 million with CFAP payments. It should be noted that the mitigating effects of CFAP payments do not account for priced inventory, entity payment restrictions or 2019 production caps. As such, the estimated \$57.9 million (\$101.6 less \$43.7) loss in producer income

mitigated by the CFAP payments should be considered a maximum, with the actual loss in producer income likely falling somewhere between \$43.7 and \$101.6 million.

From an individual producer's perspective, COVID-19 income losses without CFAP payments averaged \$64.64, \$15.59, \$50.01 and \$5.47 per harvested acre for corn, soybean, cotton and wheat. With CFAP payments, income losses were reduced to \$32.74, \$6.77 and \$8.51 per harvested acre for corn, soybean and cotton (wheat did not receive a CFAP payment).

Looking forward, the analysis does not quantify the impact of COVID-19 on the 2020 crop prices and associated farm incomes. However, the resulting low prices due to the COVID-19 pandemic are hindering producers' efforts to forward price or hedge 2020 production. The lack of forward pricing to this point in the year will likely result in a compressed marketing interval for row crop producers. However, prices still have time to recover from the influences of the COVID-19 pandemic before 2020 crops are harvested. The COVID-19 pandemic is creating evolving agricultural commodity market impacts. The market conditions for the 2020 crop will depend on how the pandemic evolves, global and national economic conditions, and agricultural commodity price levels between now and the fall. Hence, additional analysis of the effect of the COVID-19 pandemic for the 2020 crop will likely be warranted.

References

- United States Department of Agriculture, Agricultural Marketing Service (USDA-AMS). 2020. "State Grain Reports." Accessed online June 1.
<https://www.ams.usda.gov/market-news/state-grain-reports#Tennessee>
- United States Department of Agriculture, Agricultural Marketing Service (USDA-AMS). 2020a. "Cotton and Tobacco Market News: Daily Spot Cotton Quotations." Accessed online June 1. <https://www.ams.usda.gov/market-news/cotton-tobacco>
- United States Department of Agriculture, Economic Research Service (USDA-ERS). 2020. "Season-Average Price Forecasts." Accessed online June 14.
<https://www.ers.usda.gov/data-products/season-average-price-forecasts/>
- United States Department of Agriculture, Farm Service Agency (USDA-FSA). 2020. "Non-Specialty Crops and the Coronavirus Food Assistance Program." Accessed online June 3. <https://www.farmers.gov/cfap/non-specialty>
- United States Department of Agriculture, National Agricultural Statistics Service (USDA-NASS). 2020. "Quick Stats: Corn, Cotton, Soybean and Wheat, Monthly Price Received for Tennessee." Accessed June 5.
<https://quickstats.nass.usda.gov/>

United States Department of Agriculture, National Agricultural Statistics Service (USDA-NASS). 2020a. "Quick Stats: Corn, Cotton, Soybean and Wheat, Production for Tennessee." Accessed June 5. <https://quickstats.nass.usda.gov/>



UTIA.TENNESSEE.EDU

W 919 7/20 Programs in agriculture and natural resources, 4-H youth development, family and consumer sciences, and resource development. University of Tennessee Institute of Agriculture, U.S. Department of Agriculture and county governments cooperating. UT Extension provides equal opportunities in programs and employment.