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5-27-2020

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Cornhusker Economics

The Impact of the COVID-19 Crisis on Nebraska's Ethanol Industry

Market Report	Year Ago	4 Wks Ago	5-22-20
Livestock and Products, Weekly Average			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight.	*	*	*
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb.	168.64	160.88	164.63
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb.	145.13	128.00	136.57
Choice Boxed Beef, 600-750 lb. Carcass.	220.64	272.33	405.40
Western Corn Belt Base Hog Price Carcass, Negotiated	75.82	*	*
Pork Carcass Cutout, 185 lb. Carcass 51-52% Lean.	83.66	75.28	99.03
Slaughter Lambs, woolled and shorn, 135-165 lb. National.	155.58	162.25	NA
National Carcass Lamb Cutout FOB.	393.43	408.60	410.06
Crops, Daily Spot Prices			
Wheat, No. 1, H.W. Imperial, bu.	4.10	4.28	3.95
Corn, No. 2, Yellow Columbus, bu.	3.84	2.76	2.84
Soybeans, No. 1, Yellow Columbus, bu.	7.34	7.66	7.68
Grain Sorghum, No.2, Yellow Dorchester, cwt.	6.14	5.64	6.13
Oats, No. 2, Heavy Minneapolis, Mn, bu.	3.24	3.02	3.46
Feed			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton.	*	*	*
Alfalfa, Large Rounds, Good Platte Valley, ton.	105.00	90.00	87.50
Grass Hay, Large Rounds, Good Nebraska, ton.	90.00	85.00	80.00
Dried Distillers Grains, 10% Moisture Nebraska Average.	121.00	193.33	NA
Wet Distillers Grains, 65-70% Moisture Nebraska Average.	42.75	56.65	NA
* No Market			

The costs associated with the COVID-19 pandemic and its consequences have been tremendous for Nebraska and the nation. Some of the costs are a direct consequence of the health crisis induced by the pandemic; other costs came from policy decisions imposed to reduce the propagation of the pandemic, with various effectiveness levels; and other consequences came from human self-preservation and spontaneous response to the health risk. All of these effects have been taking place locally and globally, affecting global and local commodity prices in various ways but most often, dramatically down. In the fossil energy sector, prices were already low prior to the crisis because of ample supplies, as explained below.

This article looks at the impact of the pandemic crisis on Nebraska's ethanol industry. We trace the changes in return margins since the last quarter of 2019 to early May of this year and show the deterioration of these margins and the resulting reduced returns, gross revenues and production reduction induced by the low returns.

The contraction of the Nebraska ethanol industry has been happening in the context of a dramatic decrease in energy use in the U.S. and worldwide. In the U.S., consumption of gasoline has decreased dramatically because car use and travel have been reduced to a small fraction of what they were a few months ago. People have been staying at home and either working from home or being unemployed, parents stopped driving children to school, and car travel has been cur-

curtailed by the various lock-down policies and travel restrictions imposed by many states. As the demand for gasoline has collapsed, ethanol use has also decreased tremendously, proportionally to the decrease in gasoline consumption. Ethanol prices have been deteriorating along with gasoline prices. For example, regular unleaded gasoline retail prices in Nebraska fell by 28%, from \$2.42 per gallon in December 2019 and January 2020 to \$1.74 per gallon in April 2020. Recent prices are comparable to the low prices experienced at the end of 2008 in the previous global crisis.

The evolution of ethanol margins

In Nebraska, the majority of ethanol plants use corn as a feedstock. They extract dry distiller grains solubles (DDGS), which is a feed product and corn oil, which is also used in feed or as biodiesel feedstock as valuable co-products produced in fixed proportions. The typical assumptions are that a bushel of corn yields 2.8 gallons of ethanol, 17 pounds of DDGS, and 0.7 of a pound of corn oil. The fermentation process uses natural gas. There are also other costly inputs associated with the production of ethanol and corn oil. For these, we follow the assumptions of the Center for Agricultural and Rural Development at Iowa State University https://go.unl.edu/card_iastate. We assume \$0.30 of additional cost per gallon of ethanol produced and \$0.05 per pound of corn oil extracted.

To follow the evolution of these markets, prices for ethanol, DDGS, corn oil, corn, and natural gas are shown in Table 1 for different points in time since the end of November 2019. These commodity prices are determined by global and local market forces combined. Local market conditions add another layer of downward pressure or in rare cases, like for DDGS, a small increase because of reduced DDGS production. Table 1 shows that ethanol prices have fallen by roughly 37% since the end of November. The price drop was even worse in April (\$0.74 per gallon) and demand has recovered somewhat since. The prices of DDGS and corn oil have been stable. As ethanol production has decreased, less DDGS and corn oil were produced and extracted which has had a positive impact on their prices.

On the cost side of the ethanol margin, corn prices fell from around \$3.50 per bushel in November to \$2.94 in May 2020. The price of natural gas also fell by about 25% between the end of November 2019 and May 2020. Hence, the cost of operating ethanol

plants fell, but not nearly enough to compensate for the much lower price of ethanol.

Table 2 shows that with all these price changes combined, margins fell by 71% between the end of November 2019 and May 2020. The deterioration of margins was at its worse at the beginning of the crisis as suggested by Table 2. The vastly expanded oil production in the U.S. with fracking has kept gasoline prices quite low for the last five years.

Impact on the NEebraska ethanol industry

Table 2 shows that with the deteriorating margins, ethanol (and co-products) production has decreased by about 34% between the end of 2019 and May 2020. Ethanol production was at 83% of capacity for the state until the end of 2019. Production fell first by a few percentage points to 80%, at the end of February, and then, with a more precipitous decrease, fell to 55% of capacity in May 2020 (Berry, 2020).

The low margin and decrease in ethanol production have had devastating impacts on gross returns and returns over variable costs, as shown in Table 2. Revenues and returns are computed for a month, applying prices reported in Table 1 to the volume of ethanol produced for that month, as reported in Table 2. Hence, these figures are approximate. Gross revenues have fallen by 58% (from \$273 to \$114 million rounded) and returns over variable costs have fallen by 81% (\$75 to \$15 million rounded). About two-thirds of the latter drop reflects the lower margins and one-third reflects the decrease in ethanol volume.

These contractions of ethanol production and profitability have a wider impact on the state. As shown in a previous study of the Nebraska ethanol industry (Brooks et al., 2019), the ethanol industry has some indirect impact on other activities in Nebraska. Brooks et al. estimate that for \$1.00 of ethanol output, about \$0.17 of further activities is induced (\$0.12 of activities in industries selling inputs and services to the ethanol industries, and about \$.05 of activities from household spending. The other indirect effect is on tax revenues. Brooks et al. estimate that one cent of tax revenue is generated by one dollar of ethanol activities. Employment effects are small as ethanol is capital intensive and uses few workers. In any case, the temporary

Table 1. Prices determining ethanol margins (ethanol, DDGS, corn oil, corn, & natural gas)

Dates	Prices				
	Ethanol \$/Gallon	DDGS (dried 10%) \$/Ton	Corn Oil \$/pound	Corn \$/bushel	Natural Gas \$/mmbtu
11/29/19	1.52	153.50	0.23	3.50	2.367
12/17/19	1.28	160.50	0.24	3.74	2.332
1/31/20	1.24	149.00	0.27	3.73	1.843
2/28/20	1.18	141.58	0.29	3.57	1.692
5/8/20	0.96	165.00	0.29	2.94	1.775
Change Nov. to May	-37%	7%	26%	-16%	-25%

Source: National Daily Ethanol Report. USDA AMS, various issues.

Table 2. Ethanol margins and returns

Date	Margin per Bu. of Corn (\$)	Margin per Gallon (\$)	Monthly Returns from Margin (million \$/month)	Volume (million gal./month)	Gross Revenue (million \$/month)	Indirect Economic Effects of Ethanol (million \$ per month)**
End of November	1.17	0.42	75.38	179.83	273.35	46.47
End of December	0.33	0.12	21.29	179.83	230.19	39.13
End of January	0.19	0.07	11.69	175.50	217.62	37.00
End of February	0.14	0.05	8.49	173.33	204.53	34.77
Around 5/8/20	0.34	0.12	14.58	119.17	113.80	19.35
May - November Change	-71%	-71%	-81%	-34%	-58%	-58%

* Volume is based on percent use of capacity communicated by the Nebraska Ethanol board applied to an annual capacity of 2.6 Billion gallon then divided by 12.

** Indirect effects are 17% of direct gross revenues in ethanol production following Brooks et al.

contraction of the Nebraska ethanol industry still generates further contraction in industries selling inputs and services to the ethanol industry and then a contraction through reduced household consumption. Using these estimated multipliers, Table 2 shows that the indirect activity has contracted by about \$27 million on a monthly base, comparing the estimate for the end of November to that of early May.

What the future holds

To try to contain these losses, a few ethanol producers in Nebraska have been producing high-grade ethanol

for hand sanitizer production. However, this market is small, of the order of thousands of gallons (as opposed to millions of gallons). In addition, it requires a cumbersome FDA approval for food-grade ethanol. Once approved, the activity is lucrative, with prices hovering around \$8 and \$10 per gallon. This market is not a panacea to save the industry as a whole, because it is too small to make up for the losses in fuel ethanol production (Berry, 2020).

The ethanol industry, never shy of using regulation and policy to come to the rescue, has been lobbying congress for further assistance and has received some sympathetic ears in Washington D.C. The recent HEROES Act passed by Congress on May 15 includes a payment equal to \$0.45 per gallon multiplied by 50% of the number of gallons produced during the corresponding month or months of 2019, by qualifying plants for the months of January to May of this year. The bill will have to be approved by the U.S. Senate and signed by President Trump to be implemented.

Some other market changes will affect the ethanol industry in the longer run. The U.S. fracking industry was leveraged and vulnerable, before the pandemic. The industry has been devastated by the crisis, which exacerbated the impact of falling oil prices. The latter was the result of the Saudi Arabia -Russia price war which took place this year. U.S. production of petroleum will be permanently lower than it was this winter, as it is difficult to re-open closed fracking wells. Demand for gasoline should eventually recover as people will prefer to travel by car rather than going through airports and flying like in pre-pandemic times. These two factors will prop up gasoline and ethanol prices in the longer run.

References

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We thank Roger Berry and Amber Rucker of the Nebraska Ethanol Board for providing aggregate data on capacity usage and for information on the hand-sanitizer ethanol market.

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