

Iowa Farm Outlook

Department of Economics
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Doing More with Less Helps Keep Pork Industry Growing

Pork production is a growth industry. U.S. producers are turning out more pork per sow. On average, over the last 30 years, they've shipped a million more hogs per year to packers. Over those 30 years the extra hogs have provided 2% more pork per year for consumers at home and abroad.

Seasonal and cyclical production ups and downs remain. Still, producers are capturing efficiencies by boosting pork output per unit of input. Doing more with less fuels fairly consistent growth in the industry, even in the face of sometimes challenging market conditions.

Records keep falling

In the September 2016 Hogs and Pigs Report USDA began providing a table with the record high inventory estimates of all hogs and pigs, market hogs, pig crop and pigs per litter since each data series began (Table 1). Not coincidentally this aligns with the time that many inventory records began to be broken. For the first three quarterly reports of 2019, every nonbreeding herd inventory estimate has been a record high.

Table 1. Records by Quarter –United States: 1866 to Present

Item	Estimate (1,000 head)	Record high (year)	Series began (year)
All hogs and pigs			
March 1	75,086	2019	1988
June 1	75,700	2019	1964
September 1	77,678	2019	1988
December 1	83,741	1943	1866
Market			
March 1	68,738	2019	1988
June 1	69,291	2019	1964
September 1	71,248	2019	1988
December 1	68,590	2018	1963
Pig crop			
December-February ¹	33,327	2019	1970
March-May	34,177	2019	1970
June-August	35,306	2019	1970
September-November	34,154	2018	1970
Pigs per litter			
December-February ¹	10.70	2019	1970
March-May	11.00	2019	1970
June-August	11.11	2019	1970
September-November	10.76	2018	1970

¹ December preceding year.

Source: USDA-NASS

Most December 2019 inventories will almost certainly set records as well. The only non-record will be the December 1 all hogs and pigs estimate. That record was set in 1943 at 83.741 million hogs and pigs as farmers geared up for World War II. The December 2018 all hogs and pigs estimate at 74.915 million was only 8.826 million short of the 1943 high. The U.S. added that many hogs and pigs in the last six years.

Short vs. long run considerations

In the short-run, how many hogs and pigs the country has is what matters. Current and pipeline supplies along with the demand situation, determine prices. In the long run, productivity matters more than hog and pig inventories. Production efficiency of U.S. hog farms is what determines whether pork is competitive with other meats in the domestic market. Production efficiency also determines whether U.S. pork is competitive with foreign pork on the world market.

Rising productivity means more pigs, fewer sows

USDA's estimate of the national breeding herd on September 1, 2019 was 6.431 million head (Table 2). This is the largest swine breeding herd since June 1, 1999. Still the U.S. sow herd is down more than 6% from September 1998 and nearly 11% smaller than in September 1988.

Table 1. USDA Quarterly Hogs and Pigs Report Summary

	U.S.			Iowa		
	2018	2019	2019 as % of '18	2018	2019	2019 as % of '18
September 1 inventory *						
All hogs and pigs	75,136	77,678	103.4	23,600	24,900	105.5
Kept for breeding	6,330	6,431	101.6	1,040	1,010	97.1
Market	68,806	71,248	103.5	22,560	23,890	105.9
Under 50 lbs	22,192	22,616	101.9	5,900	6,210	105.3
50-119 lbs	20,357	20,849	102.4	7,750	7,930	102.3
120-179 lbs	14,066	14,814	105.3	5,210	5,610	107.7
180 lbs and over	12,190	12,969	106.4	3,700	4,140	111.9
Sows farrowing **						
Mar – May	3,100	3,108	100.3	560	520	92.9
Jun – Aug	3,200	3,179	99.3	580	540	93.1
Sep – Nov ¹	3,174	3,155	99.4	560	530	94.6
Dec – Feb ²	3,114	3,110	99.9	530	520	98.1
Jun – Aug pigs per litter	10.72	11.11	103.6	11.20	11.35	101.3
Jun – Aug pig crop *	34,320	35,306	102.9	6,496	6,129	94.4

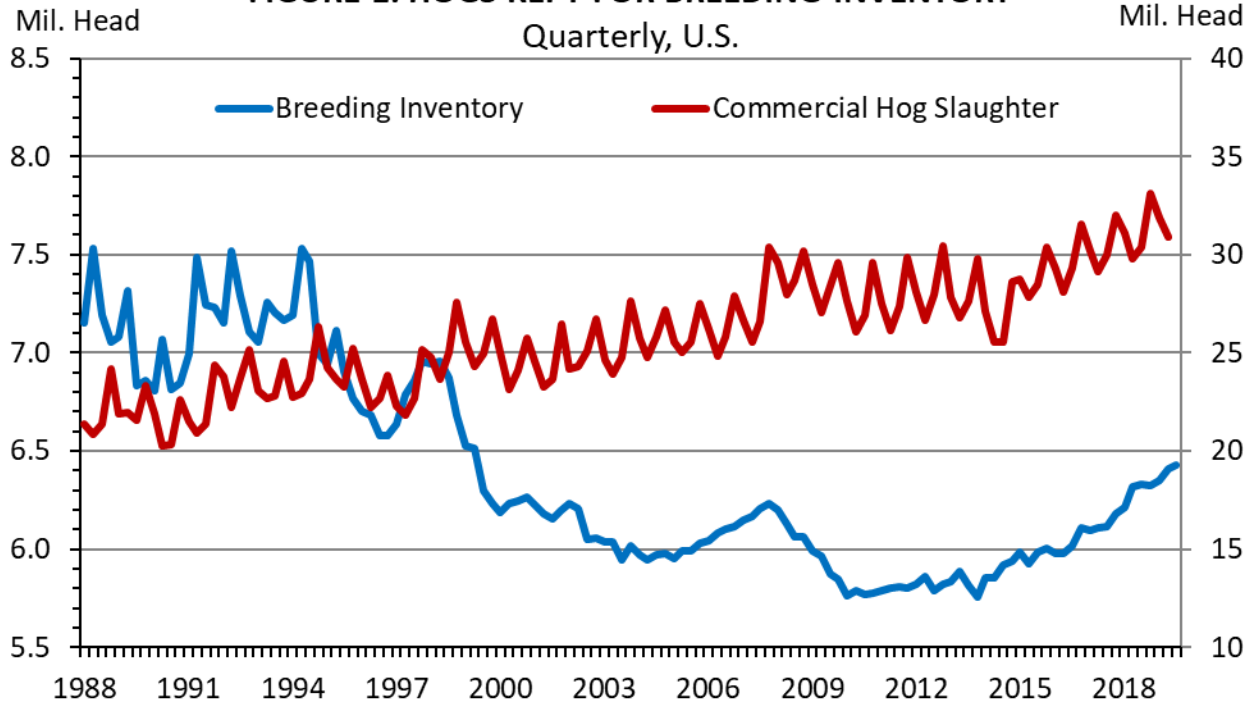
Full report: <https://downloads.usda.library.cornell.edu/usda-esmis/files/rj430453j/ht24wz08d/1v53k967v/hgpg0919.pdf>

* 1,000 head; **1,000 litters; ¹ 2019 intentions; ² December preceding year, intentions for 2019/20.

The size of the breeding herd is actually a poor predictor of slaughter levels. Hog slaughter has kept rising as the U.S. breeding herd has generally declined (Figure 1). In fact, the correlation between hog slaughter and the breeding herd is -0.75 since 1988. Not only are they not very highly correlated, the relationship is actually negative. Why the negative correlation with the breeding herd? Increasing productivity is the big driver, especially pigs per litter.

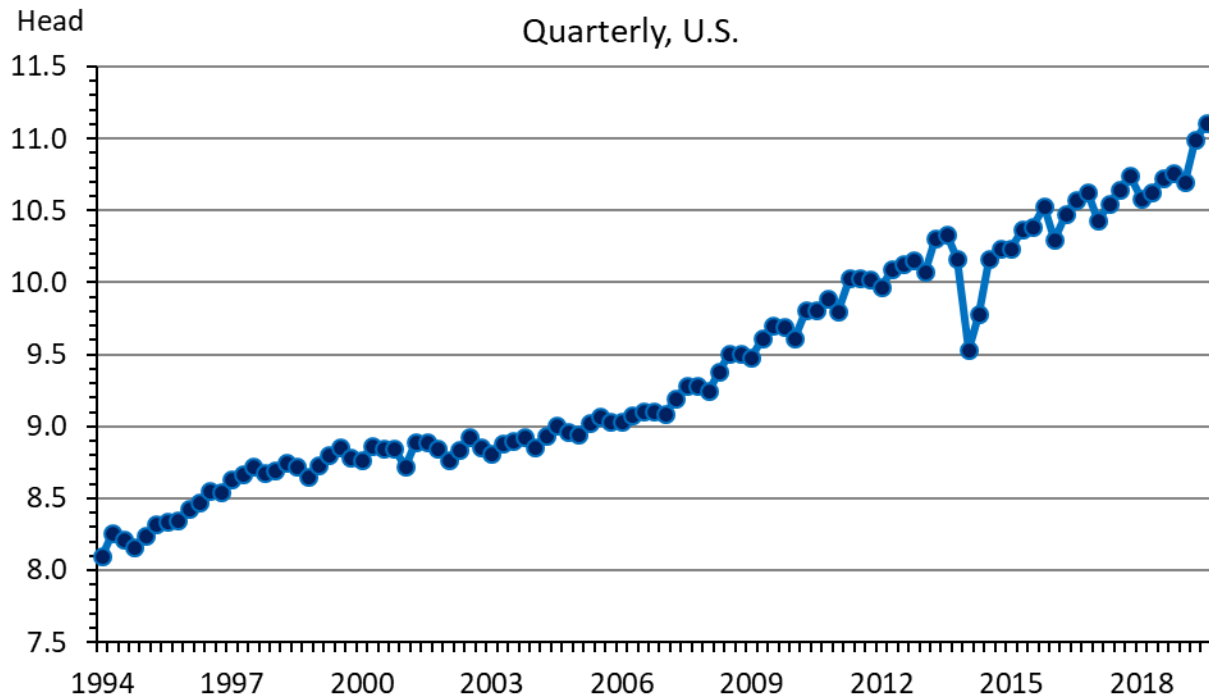
The June-August 2019 pig crop tallied 11.11 pigs per litter, up 3.6% from a year ago (Figure 2). This was record large for any quarter and the first time the June-August quarter was in the elevens. The March-May 2019 quarter was at 11.00. Pigs per litter have topped the year-ago level each quarter since September-November 2014. Over those five years growth in pigs per litter averaged 1.9% per year. Will producers set a new record for September-November this year? Probably, since sows farrowing in the fall usually have the highest pigs per litter.

FIGURE 1. HOGS KEPT FOR BREEDING INVENTORY



Data Source: USDA-NASS

FIGURE 2. PIGS PER LITTER



Data Source: USDA-NASS

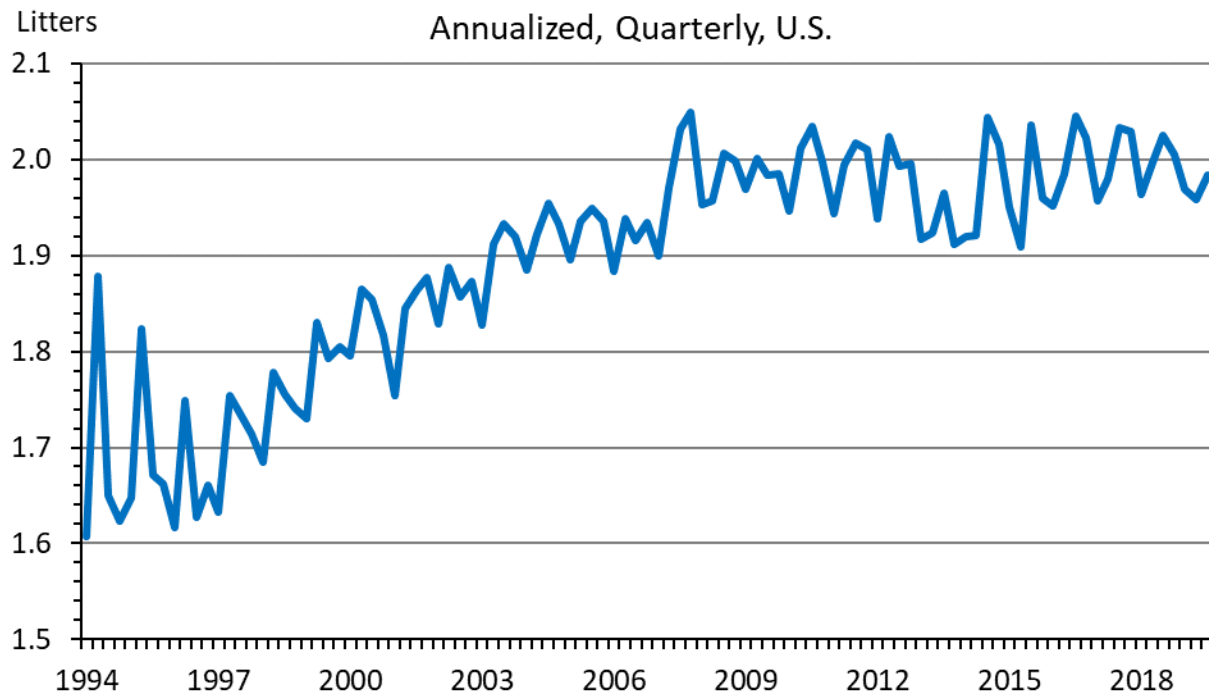
Litters per breeding animal stall

The litters per breeding animal for the most recent quarter can be calculated as June-August 2019 sows farrowing divided by the June 1, 2019 kept for breeding inventory. Multiplying this value by four provides an annualized litters per breeding animal estimate for the third quarter of 2019 of 1.98 (Figure 3). This measure is below industry benchmarking averages and has generally plateaued since 2007.

Two factors explain why. The first is biological. Assuming a gestation period of 114 days, 21 days of lactation, and a 7 day wean-to-rebreed interval puts each reproductive cycle at 142 days. That means if everything goes perfectly, a sow can produce 2.57 litters per year. Very few do. Figuring in those that do not rebreed quickly, do not breed at all, etc. results in an average of about 2.30 litters/sow/year.

The second reason is data related. The survey of U.S. hog producers asks about “hogs kept for breeding” without specifying their gender or their age. The U.S. swine breeding herd is composed of boars (of varying ages being kept for breeding), sows and gilts (being kept for breeding). USDA does not publish data on what share of the breeding females are sows being kept for breeding. Those data, if we had them, could show that breeding herd performance has steadily improved over the last decade. Nonetheless, this productivity factor may be at, or very near, its practical limit given recent performance.

FIGURE 3. LITTERS PER BREEDING ANIMAL
Annualized, Quarterly, U.S.



Data Source: USDA-NASS

Producers pack on pounds

Rising dressed weights is another big factor affecting the amount of pork that is available. Record hog prices in 2014 led to a 7.25 pound year-over-year rise in the average federally inspected barrow and gilt dressed weight (Figure 4). Dressed weights were down 1.8 pounds from the year before in 2015, but have settled in at roughly 210 pounds over the last several years.

Market hog dressed weights have averaged 210.75 pounds through the first eight months of 2019. This is 1.1 pounds or 0.5% heavier than last year. The weight increase nearly matches the long term trend for weights to rise about 0.6% per year.

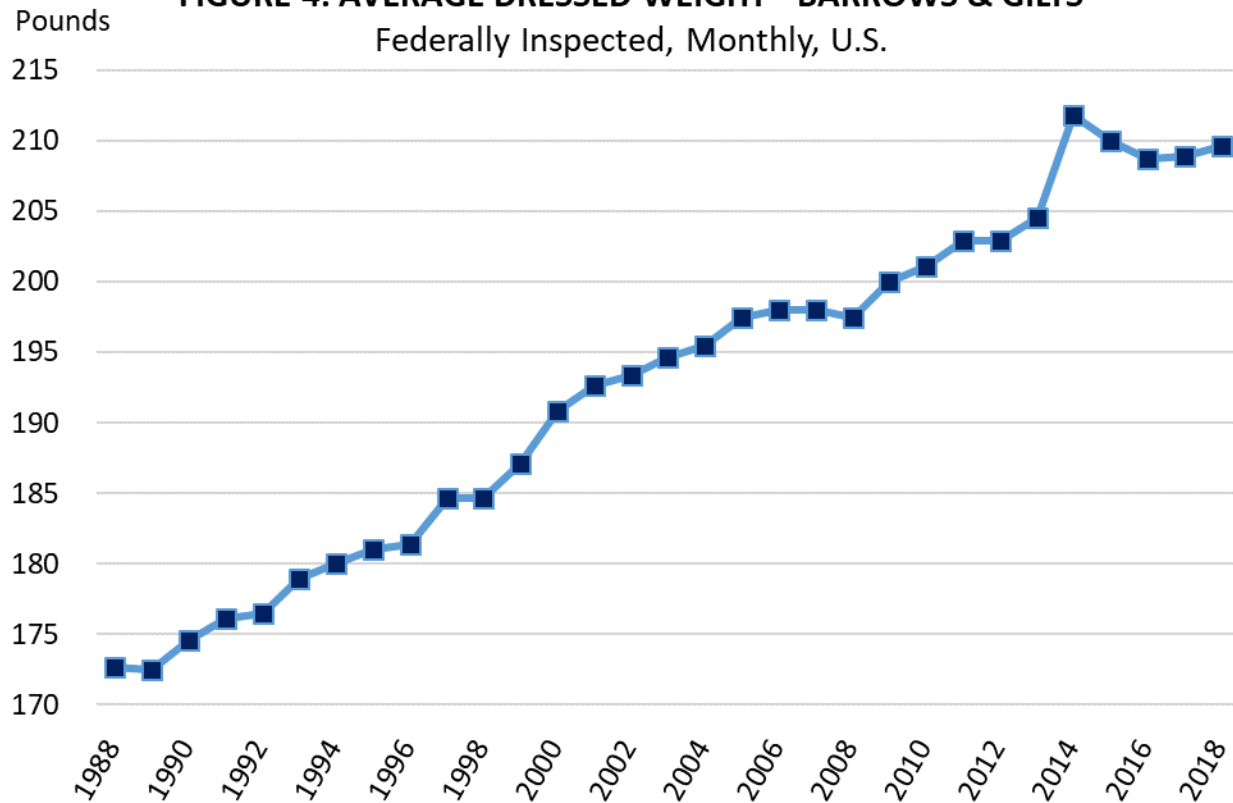
Why is the trend for heavier hog weights so strong?

Genetics, nutrition and economics all come into play. Producers, pork packers and processors all benefit from heavier hogs—as long as those hogs can convert feed efficiently. Efficient hogs allow producers to spread fixed and sunk costs over more pounds of output. Lower feed costs encourage producers to hold hogs on feed longer.

Heavier hogs allow packers to do the same with their fixed (plant, equipment, etc.) and quasi-fixed (labor really can't be reduced and increased on a whim) costs. Steady selection pressure for hogs that efficiently convert feed to lean meat has reduced the marginal cost of that last pound of gain, meaning more and more pounds of gain

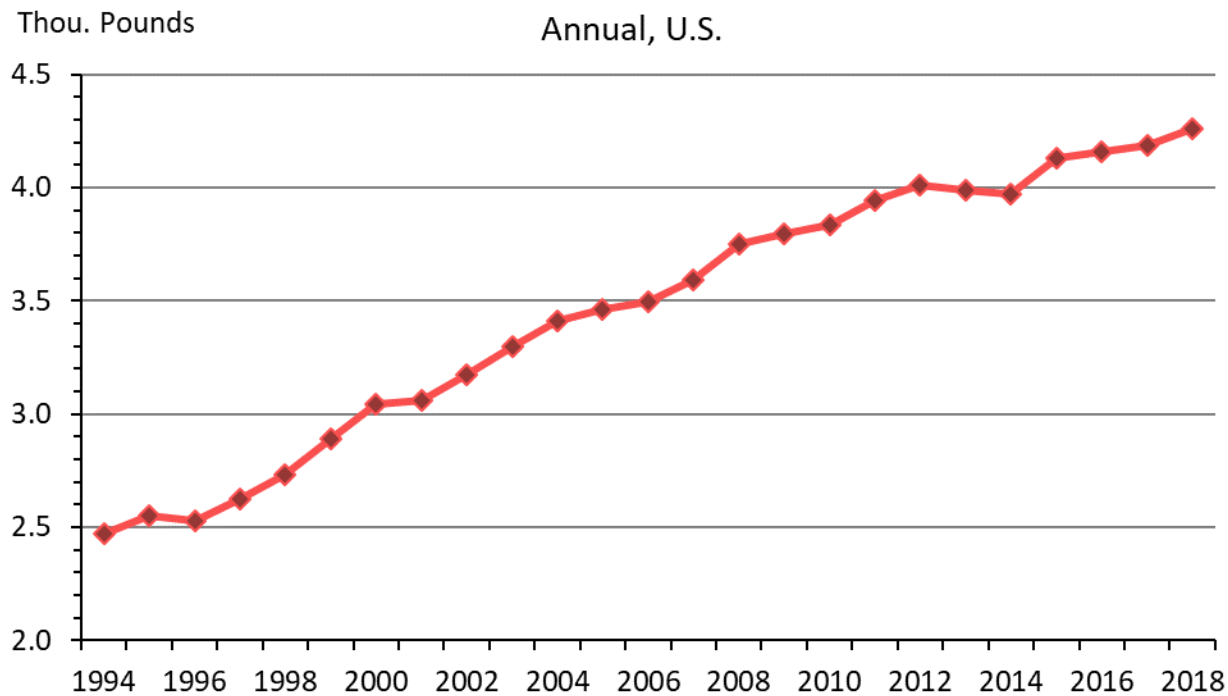
are put on each pig. Furthermore, adjustments in packer matrices have reduced the discounts for heavy hogs, meaning higher marginal revenue for those extra pounds.

FIGURE 4. AVERAGE DRESSED WEIGHT - BARROWS & GILTS



Data Source: USDA-NASS

FIGURE 5. PORK PRODUCTION PER BREEDING HOG



Data Source: USDA-NASS, Compiled & Analysis by LMIC

One final measure of productivity is pounds of pork produced annually per breeding animal. Dividing annual commercial pork production by the average breeding herd inventory shows that productivity in the pork industry has been growing at an amazing pace. Since 1994, annual dressed pork production per breeding animal

has grown from 2,469 to 4,261 pounds, up an astounding 76% (Figure 5). Each breeding animal turning out more pork means the industry needs fewer breeding animals to hit a given pork production target. U.S. pork production is a growth industry. Productivity and efficiency gains are key growth drivers.

Commercial slaughter and price forecasts

Table 3 contains the Iowa State University price forecasts for the next four quarters and the quarterly average futures prices based on September 27, 2019 settlement prices. The futures price forecasts are adjusted for a historic Iowa/Southern Minnesota basis. The table also contains the projected year over year changes in commercial hog slaughter.

Table 3. Commercial Hog Slaughter Projections and Lean Hog Price Forecasts, 2019-20

	Year-over-Year Change In Commercial Hog Slaughter (percent)	ISU Model Price Forecast, Negotiated IA/So MN (\$/cwt)	CME Futures (9/27/19) Adjusted for All Producer Sold Purchase Arrangements IA/So MN Basis (\$/cwt)
Oct-Dec 2019	3.70	69-73	70.29
Jan-Mar 2020	3.44	74-78	76.43
Apr-Jun 2020	2.33	81-85	83.90
Jul-Sep 2020	2.12	81-85	83.23

Lee Schulz

Is Usage Falling Faster Than Production?

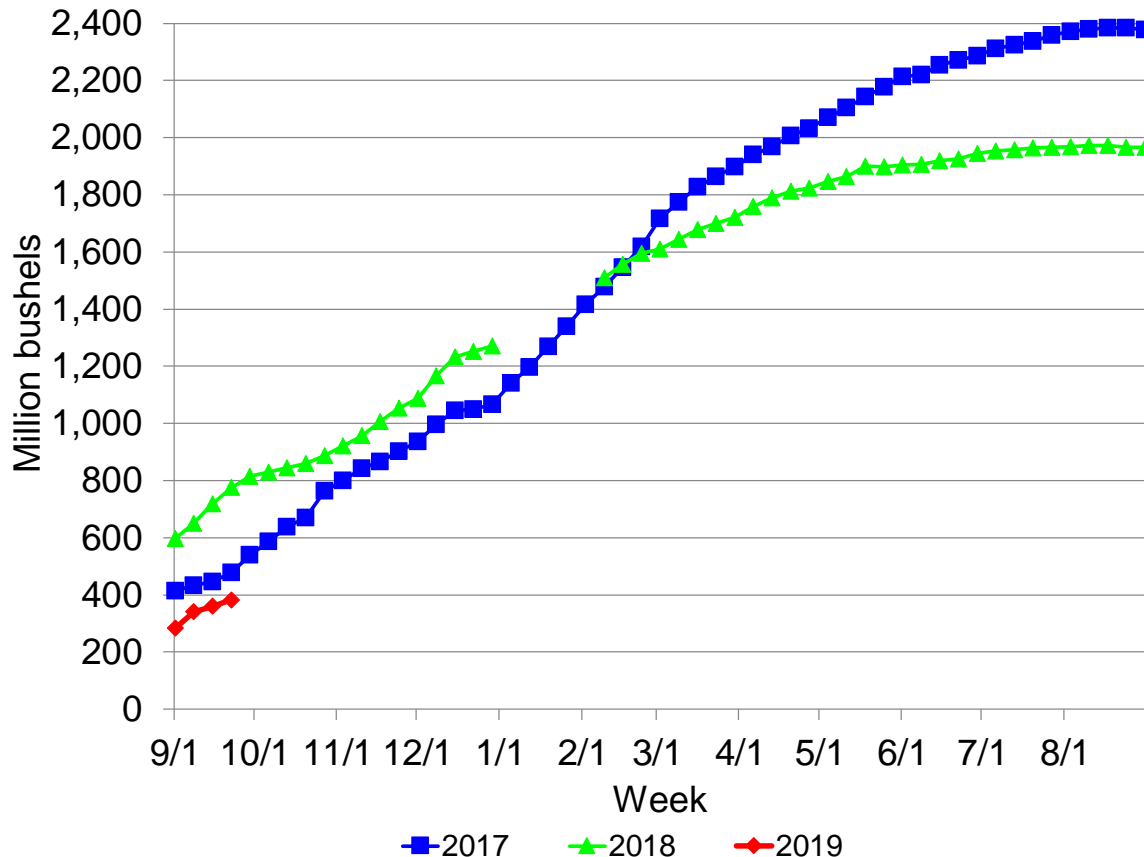
Much of the coverage of this crop year has concentrated on supply, and rightfully so, given the flooded fields, planting delays, and the continuing concerns about the maturity of the crops. But while those issues have presented significant challenges to producers as they look forward to harvesting their crops, there may be larger issues lurking as they look to market those crops. While production estimates have generally declined during the growing season, crop usage estimates have slid right along with them. The reductions in usage limit potential price increases from smaller crops.

Table 1 outlines the usage issue. When USDA estimated crop usage for the 2019/20 crops in May, they expected total corn use at 14.675 billion bushels and total soybean use at 4.195 billion bushels. For corn, USDA had the ethanol industry working through 5.5 billion bushels, feed and residual usage taking 5.45 billion bushels, and the international markets absorbing 2.275 billion bushels. For soybean, domestic crush was expected to consume 2.115 billion bushels, while exports rebounded to 1.95 billion bushels. As USDA has updated these projections over the past few months, several of those usage categories have spiraled downward. For corn, the weakness has showed up in all of the usage categories. Feed and residual use has experienced the largest declines, dropping 275 million bushels. Much of this decline is related to the production problems as residual use (mostly documenting harvest and storage losses) tends to decline as production declines (we lose less crop at harvest and in storage when there is less crop out in the field to begin with). However, some of the decline is also related to concerns about a slowdown on the livestock side. Beef export sales, while still growing, have softened this year. Pork exports remain strong, but only due to the effects of African Swine Fever in the Chinese market. In most of the other large pork export markets, such as Mexico and Japan, sales are down compared to last year.

Table 1. Crop Usage Estimates. Source: USDA-WAOB.

Corn	May (billion bushels)	Sept. (billion bushels)	Soybean	May (billion bushels)	Sept. (billion bushels)
Feed and Residual	5.450	5.175	Crush	2.115	2.115
Ethanol	5.500	5.450	Exports	1.950	1.775
Food, Seed, and Ind.	1.450	1.430	Seed	0.096	0.096
Exports	2.275	2.050	Residual	0.034	0.032
Total Use	14.675	14.105	Total Use	4.195	4.018

The second largest reduction for corn is in exports, down 225 million bushels. Advance sales going into the marketing year were roughly half of the previous year. And the data suggests that the export picture has not improved as we enter harvest. Through the end of September, corn exports are off by 51%. The reduction is widespread. In fact, it's hard to find a market where sales are better than last year. Currently, all of the countries in our top 6 corn export destinations have reduced purchases. Panama has the smallest decline at 9%. Mexico, our top market, is down nearly 13%. Japan, traditionally our 2nd largest market, is off by 57%. But the export decline is even more substantial when we look at our smaller markets for corn. For all of the countries outside of our top six, sales are down a whopping 82% so far this marketing year. Figure 1 shows the timing of the corn export problem, which began in the 2018/19 marketing year. Corn export sales were fairly strong last fall, running 100-200 million bushels ahead of the previous year's pace. However, sometime during the government shutdown (that created the gap in the data and the 2018 marketing year line), sales fell back. The export slowdown continued as corn prices rallied this spring, opening up a 400 million bushel loss to the previous year's sales. That 400 million bushel loss has persisted in the export sales for this year. The combination of robust global corn supplies, relatively high U.S. corn prices, and a strong U.S. dollar has taken its toll on the corn market.

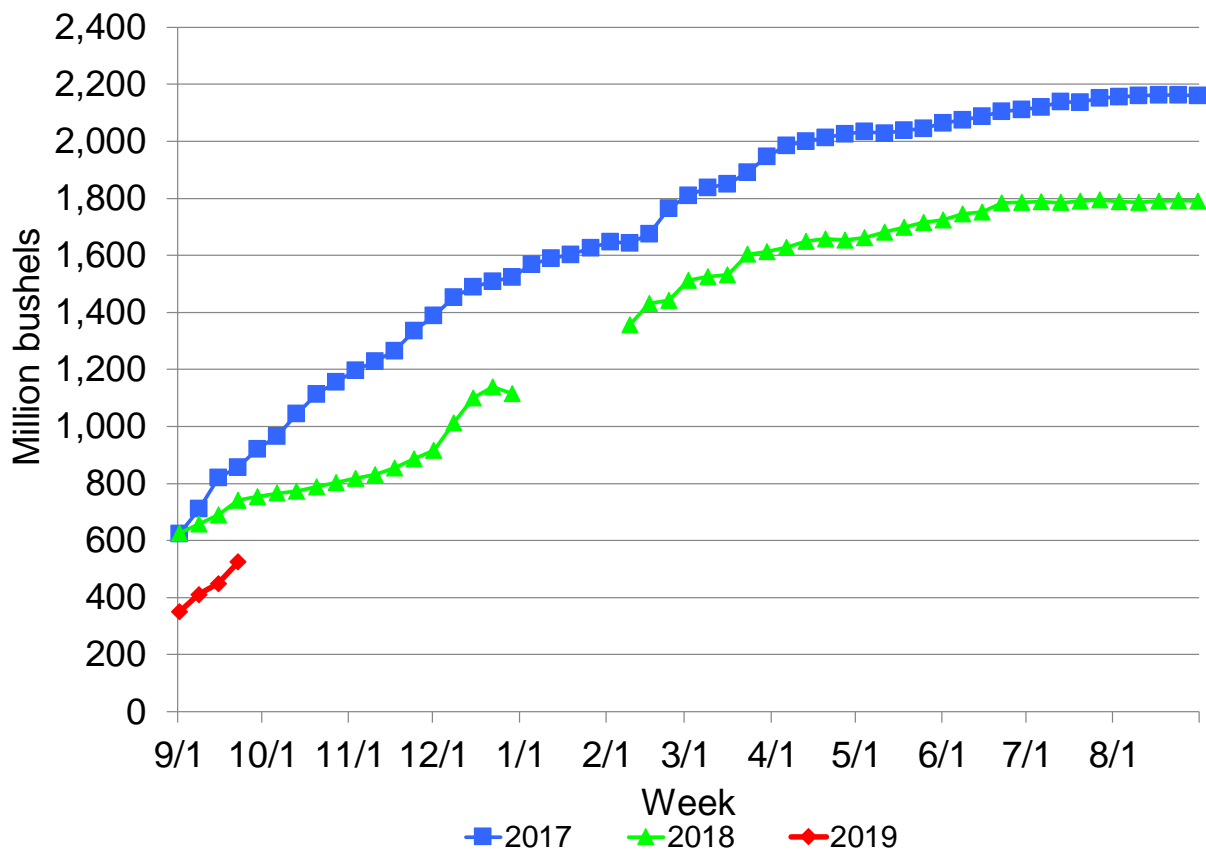
Figure 1. Corn export sales. Source: USDA-FAS.

Corn usage for ethanol has taken a much smaller slide, only 50 million bushels, but the concerns for this category were magnified by the brawl over the small refinery exemptions for the Renewable Fuels Standard.

Ethanol margins have been weak for over a year now and the exemptions exasperated that weakness. A few ethanol plants have shut down, while many others have reduced production. Data from the Energy Information Administration shows a 5% drop in ethanol production over the past two weeks. So no matter where we look in the corn market, there are reasons for concern on the demand side.

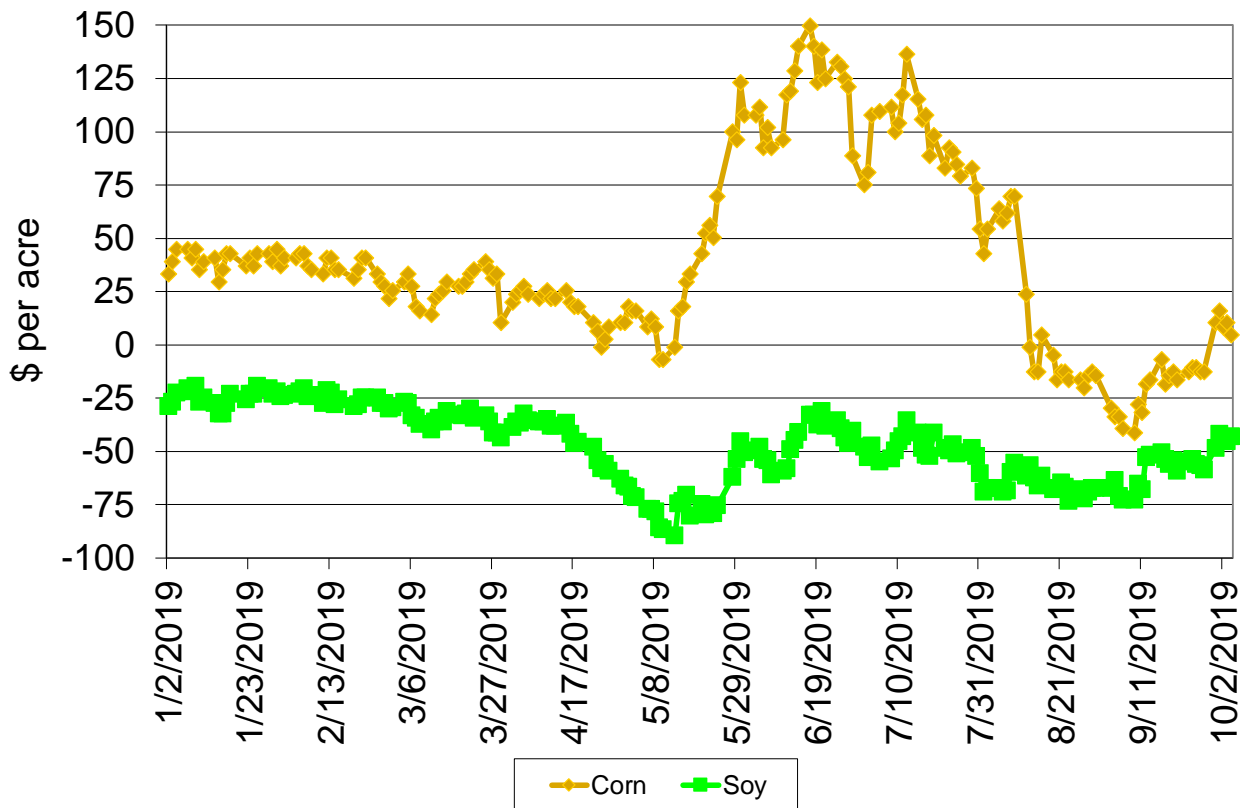
For soybeans, the decline in usage is still limited to the international markets. Since May, USDA has reduced its expectations on soybean exports by 175 million bushels. This reduction is driven by the ongoing dispute with China. As Figure 2 displays, soybean exports floundered last marketing year as the trade war ramped up. And the export pace so far this year remains below those USDA targets. While China has made some soybean purchases and maintained its status as our top soybean export markets, those sales are still well below the levels we were used to pre-trade war. A new problem this year is that soybean sales are slipping in markets outside of China. Soybean sales to Mexico are down 27%. Sales to the European Union are off 28%. And as with corn, the larger declines are showing up in our smaller markets. Soybean sales to markets outside of our top six are down 60%. It's the same combination of robust global soybean supplies, relatively high U.S. prices, and a strong U.S. dollar eroding our position in international markets.

Figure 2. Soybean export sales. Source: USDA-FAS.



The usage issue has constrained price recovery. Figure 3 tracks projected crop markets for the 2019/20 crops. While the lower production estimates and recently reported lower ending stocks have boosted prices in the short term, crop margins remain around breakeven at best. For corn, current margins are well below earlier values, reflecting the combination of the usage slide and potential production. For soybeans, margin estimates have consistently been negative throughout the year. Any anticipated price gains due to smaller crops this harvest should be tempered by the reduction in expected usage. A factor that could loom large next spring is crop quality. We could see a rebound in usage, especially from the feed and ethanol sectors, if the crops have diminished quality. It will take more bushels than usual to add weight to animals and create gallons of fuel, but we will not get confirmation of this usage boost (if it comes) until the stocks report next spring and summer.

Figure 3. 2019/20 projected crop margins.



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