# Updated Analysis: Exporting Corn through U.S. Beef and Pork

Study produced by World Perspectives, Inc. on behalf of the U.S. Meat Export Federation

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# Executive Summary

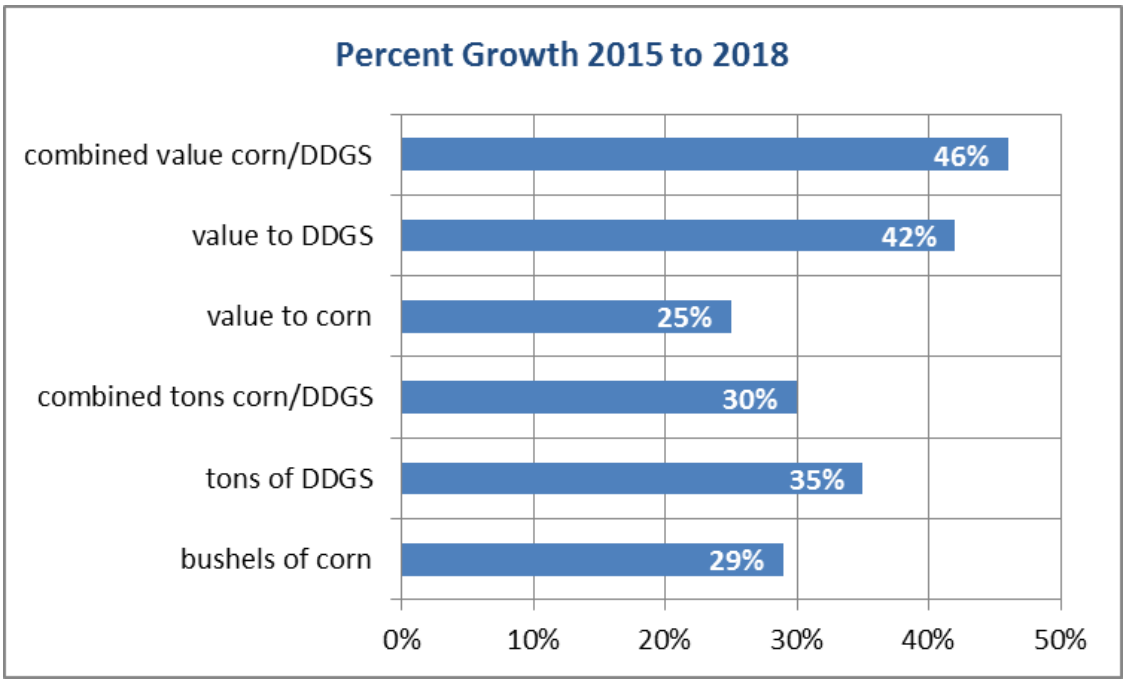
This project is an update of a previous study produced in October 2016 by World Perspectives, Inc. (WPI) on behalf of the U.S. Meat Export Federation (USMEF), with support from the National Corn Growers Association. The original study, titled *The Intersection of U.S. Meat Exports and Domestic Corn Use,* assessed the impact of U.S. beef and pork exports on domestic corn use and value. That study concluded that in 2015 exports of U.S. red meat accounted for 11.7 million tons of combined corn and DDGS use.

Domestic feed use of corn and DDGS supported by 2015 beef and pork exports broke down into:

- 355 million bushels of corn produced on an average of 2.1 million acres.
- 1.48 million tons of DDGS.
- $1.3 billion in combined value to corn and DDGS.

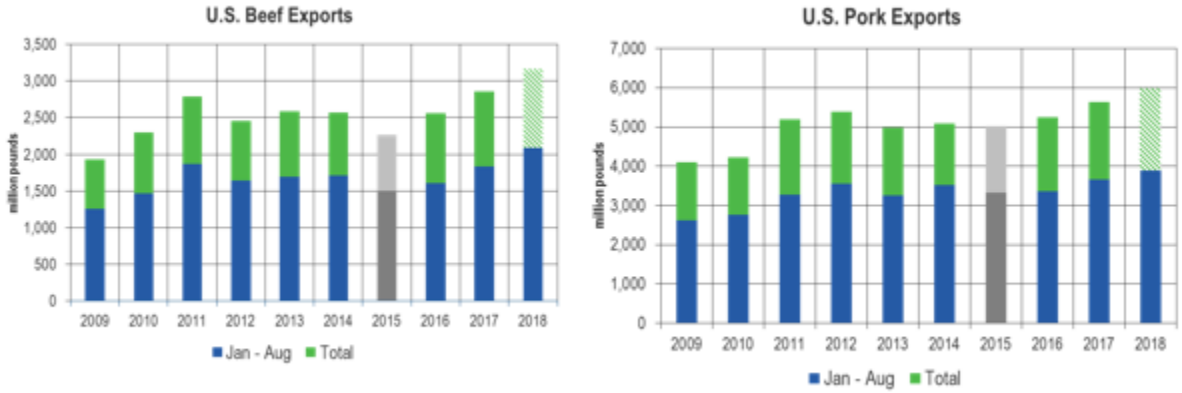
This update, based on the growth in beef and pork exports, estimates that in 2018 beef and pork exports will use a combined total of 14.9 million tons of corn and DDGS, which breaks down to:

- **459.7 million bushels of corn produced on an average of 2.6 million acres…an increase over 2015 of 29 percent.**
- **2 million tons of DDGS…an increase over 2015 of 35 percent**
- **$1.9 billion in combined value to corn and DDGS…an increase over 2015 of 46 percent.**



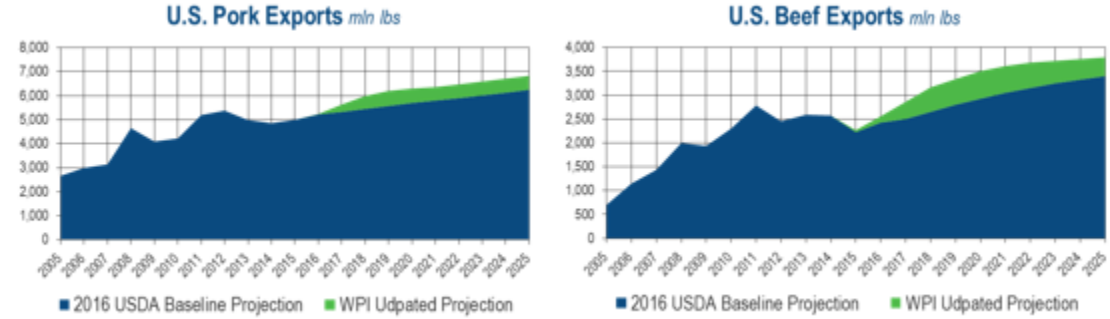

*Source: WPI, USDA*

Since 2015, exports of both beef and pork have grown dramatically – and in 2017 set new records. Through the first three quarters of 2018, global shipments were ahead of the record 2017 trend line and poised to set another record.




*Source: USDA, USMEF, WPI*

Given this record pace of beef and pork exports, USMEF requested an update of the 2016 study to assess the impact that expanding exports had on domestic corn and DDGS with new long-term projections.




*Source: USDA, USMEF, WPI*

According to an October 2018 updated forecast by World Perspectives, Inc., expanded beef and pork exports through 2025 would add an additional **450 million bushels of corn** and **2.5 million tons of DDGS** to the original 2016 forecast that was based on USDA's long-term 2016 to 2025 baseline projection.

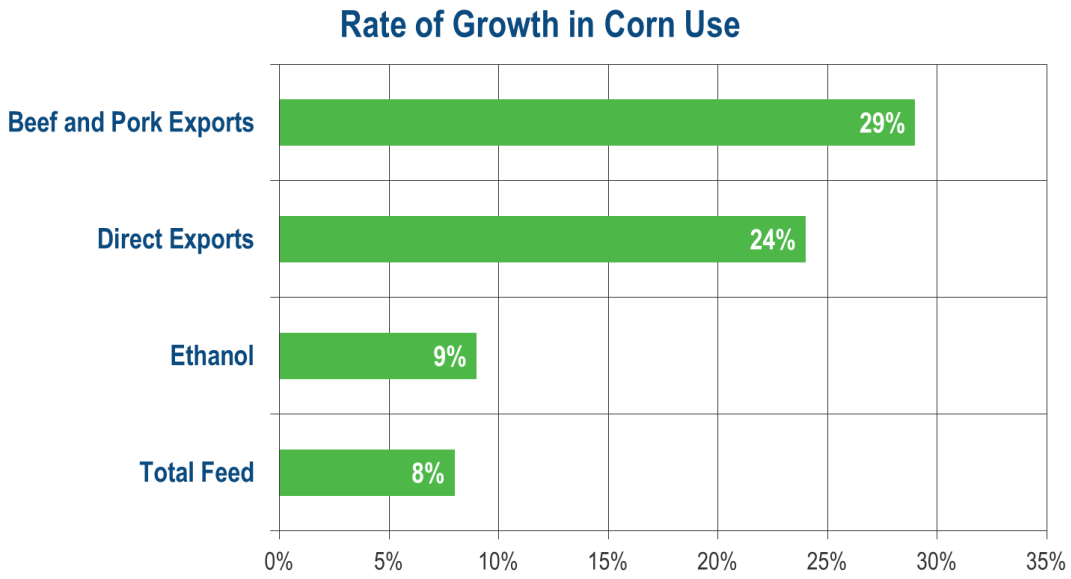
# U.S. Meat Exports Are Growing

The amount of feed utilized by U.S. meat exports is referred to as **indirect exports.** In the past three years, since the baseline period of the original study, exports have accounted for a growing percentage of U.S. beef and pork exports. Through the first three quarters of 2018, exports have totaled 11.1 percent of beef production based on muscle cuts (13.7 percent when including offal and variety meats) and 22.7 percent of pork muscle cuts (and 26.1 percent including offal and variety meats) making the red meat-derived indirect exports of corn and DDGS an increasingly important driver of value to U.S. farmers.

| Percent of U.S. Production Exported | | |
|---|---|---|
| **Meat** | **2006-2015** | **2016-2018** |
| Beef | 8 | 10.7 |
| Pork | 19 | 22.2 |

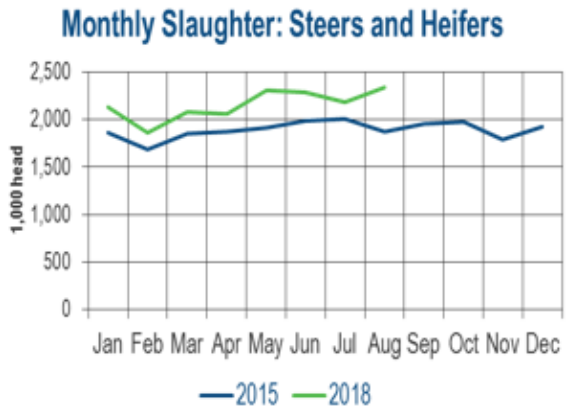
*Source: WPI, USMEF, USDA; excludes variety meats.*

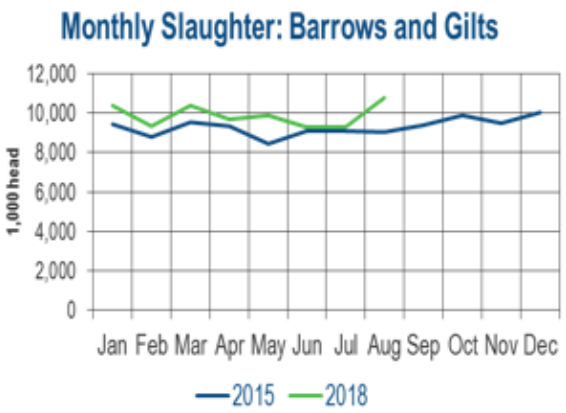
Since 2015, **indirect exports represent the fastest growing category of corn use.** Over the period, one in every four bushels of added feed demand for corn is due to beef and pork exports.




*Source: WPI, USDA*

Even as the percent of beef and pork that is exported grows, so too has total domestic production of hogs and fed cattle. Through the first nine months of 2018 fed cattle slaughter was nearly 14.7 percent greater, and barrow and gilt slaughter was 7.8 percent more, than the same period in 2015 when the last analysis was conducted.



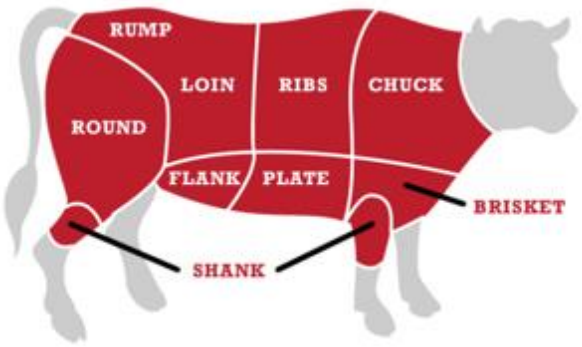

*Source: USDA, WPI*

# Measuring Feed Demand

As the USDA's Feed Outlook report has noted, "…there is no survey or other direct measurement available for the volume…" of feedstuffs fed to livestock. Moreover, feed rations are highly variable – they can vary by region, with price or availability of substitutable ingredients; by type and sophistication of operation, etc. However, some basic formulas can be developed to estimate the amount of feed used in U.S. red meat production, and to calculate indirect exports of corn and soybean meal.

WPI's research has **quantified the average feed demand of domestic beef and pork production and then estimated the proportion of that demand that can be attributed to U.S. exports of pork and beef.** The estimates for the update in this report are based on 2018 year-to-date averages in cattle placements, days on feed, and slaughter weights for cattle and hogs, with an end of the year forecast for seasonal trends in slaughter weights.

Compared to 2015, corn and DDGS use per head of fed cattle slaughtered was down on lighter live weights, but increased slaughter volumes more than offset that reduction.



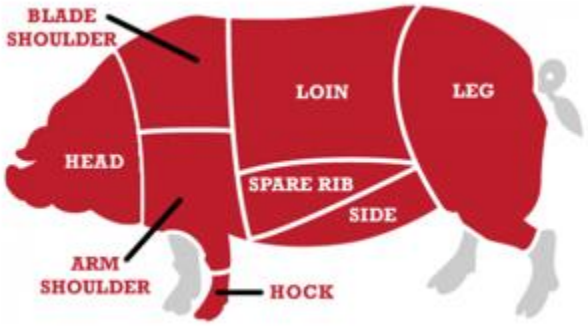

| Feed Use Cut Out for Beef | | |
|---|---|---|
| **Primal** | **Corn** *in bu.* | **DDGS** *in lbs.* |
| Round | 7.3 | 166.1 |
| Loin | 5.4 | 123.3 |
| Rib | 3.1 | 70.1 |
| Chuck | 9.9 | 223.2 |
| Flank/Plate/Brisket | 6.3 | 143.3 |
| Shank | 1.5 | 34 |

*Source: WPI*

For barrows and gilts, corn and DDGS use per slaughtered head remained steady between the two years.

| Feed Use Cut Out for Pork | | |
|---|---|---|
| **Primal** | **Corn** *in bu.* | **DDGS** *in lbs.* |
| Butt/Blade Shoulder | 1.2 | 3.9 |
| Picnic/Arm Shoulder | 1.24 | 4.1 |
| Loin | 2.9 | 9.6 |
| Spare Rib | 0.5 | 1.74 |
| Side Belly | 1.77 | 5.86 |
| Leg/Ham | 2.76 | 9.1 |
| Other (*jowl, leg, hock*) | 0.9 | 2.7 |

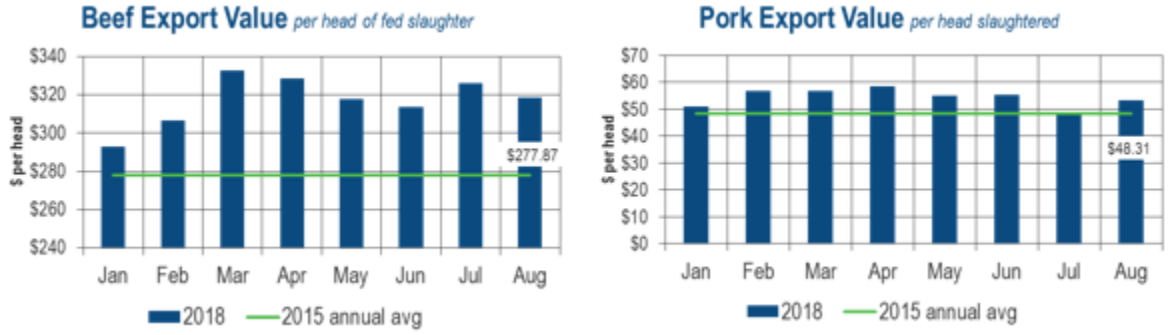
*Source: WPI*



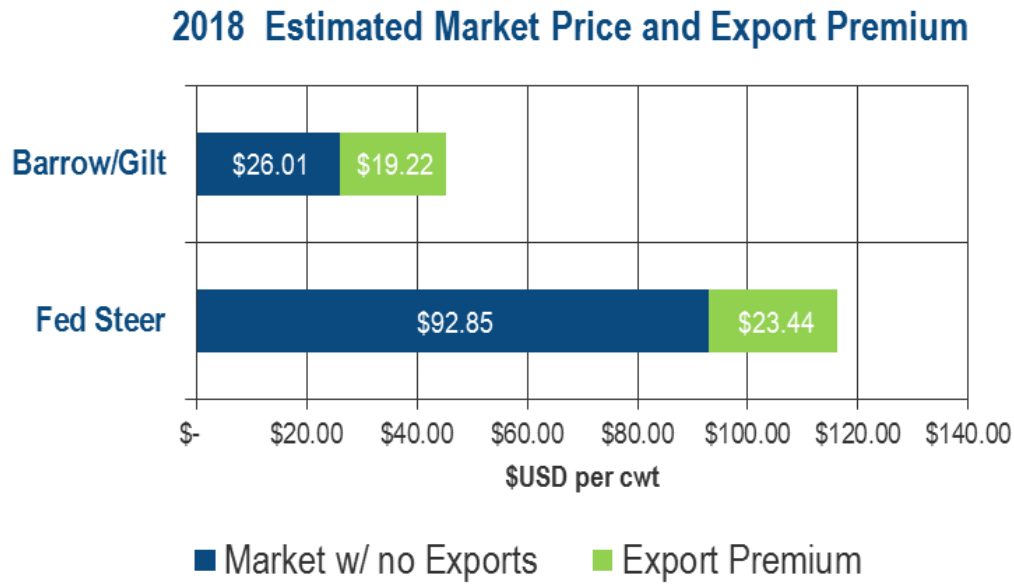
# Value of Meat Exports to Corn and DDGS

Meat exports help corn growers and ethanol mills not only by increasing the quantity demanded of corn and DDGS, but also by increasing value. **Export markets are a way to provide extra value to the carcass by exporting cuts that are undervalued in the U.S.** These cuts include beef short plate, short ribs, chuck short ribs, and chuck and round cuts as well as pork hams, butts, picnics, and loins. Further value is added by the export of variety meats.

By exporting these otherwise undervalued cuts, value is added to the overall carcass. In 2015, for beef, exports created a value of $277.87 per slaughtered head**; in 2018 the projected value is $317.15 per slaughtered head for beef.** Pork exports created a value of $48.31 per slaughtered head in 2015; **in 2018 the value is projected to be $54.38 per slaughtered head for pork.** This value can be considered an export premium.




*Source: USDA, USMEF, WPI*




*Source: WPI, USMEF, USDA*

The export premium directly impacts livestock finishers' capacity to cover feed costs. A positive export premium adds to the profitability of feeding, which helps both the feeder and the corn farmer.

| 2018 Budget for Finishing One Steer Calf | | | Breakeven Feed Cost/head |
|---|---|---|---|
| 750 lb. feeder calf | 1 head | $1,162.50 | With export premium: $273.69 |
| Interest at 9% | 5.5 months | $41.85 | W/O export premium: ($43.45) |
| Non-feed variable costs | 5.5 months | $77.71 | |
| Fixed costs | | $14.00 | |
| Total non-feed costs | | $1,296.06 | |

*Source: WPI, USDA, Iowa State University Extension*

| 2018 Budget for Finishing One Feeder Pig | | | Breakeven Feed Cost/head |
|---|---|---|---|
| 10-12 lb. feeder pig | 1 head | $45.00 | With export premium: $46.09 |
| Interest at 8% | 5 months | $1.51 | W/O export premium: ($8.30) |
| Non-feed variable costs | 5 months | $24.12 | |
| Fixed costs | | $11.28 | |
| Total non-feed costs | | $81.91 | |

*Source: WPI, USDA, Iowa State Extension*

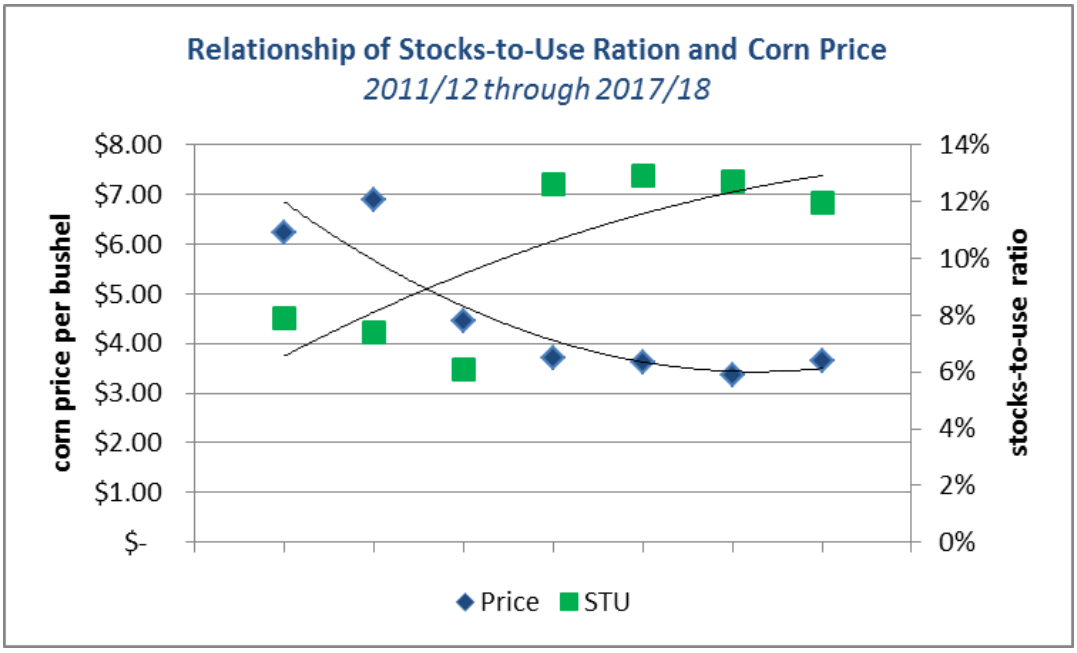
# The Impact of Red Meat Exports on the Price of Corn

Demand for feed from meat exports adds to the price of corn. **While red meat exports comprise only about 3 percent of total corn use, commodities are priced on the margin so the marginal demand for corn driven by beef and pork exports has a significant price impact.**

The price relationship between supply and demand is complex and dynamic; however, the following calculation applies a model of how indirect exports through beef and pork can be estimated to have impacted corn prices in a given year. This model is based on "snapshots" of the marketplace with end-of-the-year averages for corn and using red meat exports as a variable.

1. Hold other demands constant (i.e. food, seed, industrial, ethanol, non-pork and beef feed demand).
2. Hold supply constant.
3. Assume that there were no beef or pork exports.
4. Assume that half of the feed not utilized by meat exports is instead exported directly; and add the other half to the year-end stocks-to-use ratio.

The chart below shows the annual average price of corn and its relationship to the market year ending stocks-to-use ratio. Based on the correlation of these curves, and applying the above formula, **it can be estimated that beef and pork exports in 2018 contributed about $0.39 to an average corn price of $3.53/bushel.** That value breaks down to approximately $0.11 per bushel from beef and $0.28 per bushel from pork.

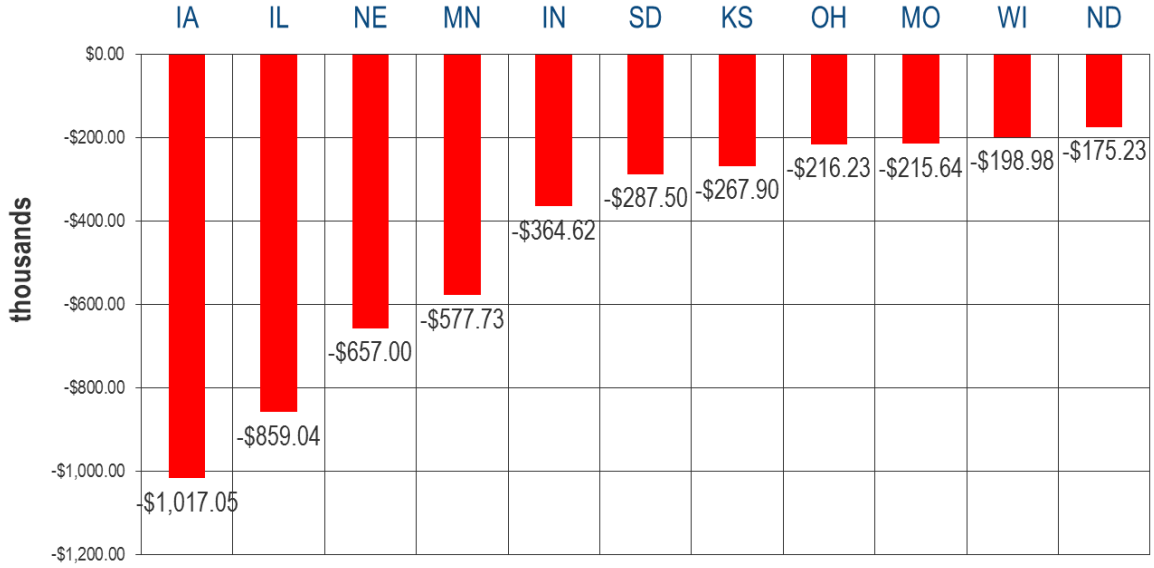



*Source: WPI based on USDA WASDE data*

Based on this calculation, without red meat exports in 2018, corn growers would have lost about $5.7 billion in value this year. Below is a breakdown of that value by state.

## Lost value to corn by state

*w/o beef and pork exports in 2018*



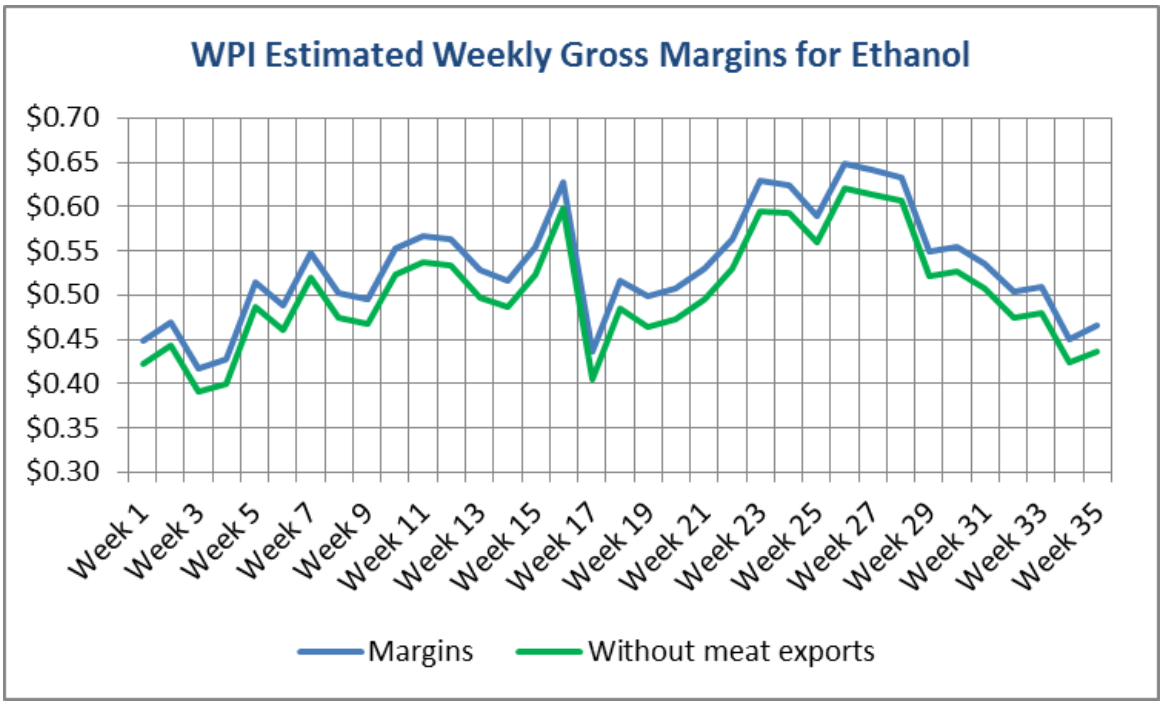
# Red Meat Exports Impact on DDGS

Beef and pork exports also have a direct impact on the utilization and value of DDGS. Overall, the value of DDGS sold for feed to livestock represents about 23 percent of the value of ethanol per bushel of corn.

| Inputs for ethanol | | |
|---|---|---|
| Corn $/bu | $3.43 | |
| Natural Gas $/MMBtu | $3.48 | |
| **Output of Ethanol Mill per bu of corn** | *w/ DDGS* | *w/o DDGS* |
| Ethanol | $3.86 | $3.86 |
| DDGS | $1.20 | - |
| Distillers oil | $0.16 | $0.16 |
| Gross Margin | $5.22 | $4.02 |

*FOB Iowa ethanol plant, year-to-date through September 2018.*
*Source: USDA, WPI, Iowa State University*

Beef and pork exports in 2018 represent about $291 million in value to DGGS. Eliminating the demand for the more than 2 million tons of DDGS utilized by beef and pork exports from the 31 million ton total DDGS feed demand could mean as much as $0.03 per gallon gross margin for ethanol mills.

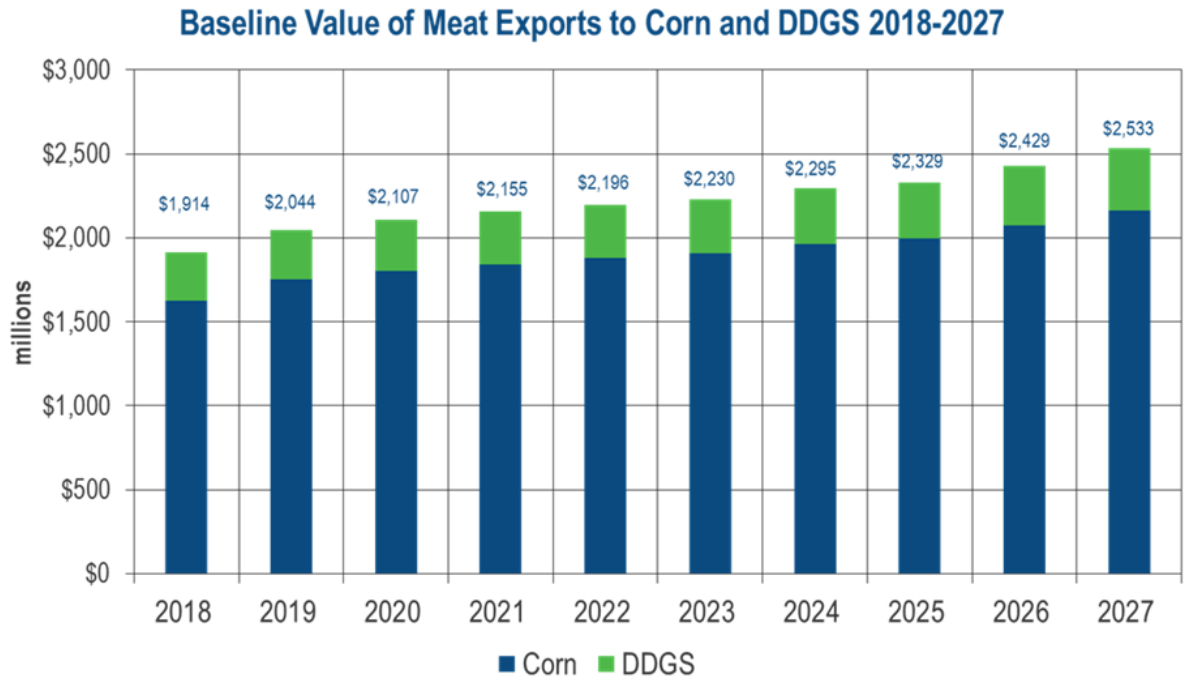



*Source: WPI, USDA, Iowa State University*

**Combined, the value of beef and pork exports to corn and DDGS is projected to total $1.9 billion; $1.62 billion to corn and $291 billion to DDGS.**

# Long Term Impact of Meat Exports

Over the baseline period 2018-2027, the combined value of beef and pork exports to corn and DDGS is projected to total $22.2 billion; $19 billion for corn and $3.2 billion for DDGS. That cumulative 10-year total is almost 19 percent more than the $18.7 billion projected in 2016 using USDA's 2016-2025 long term baseline meat export forecast.




*Source: WPI, USDA*

A breakdown by U.S. state follows.

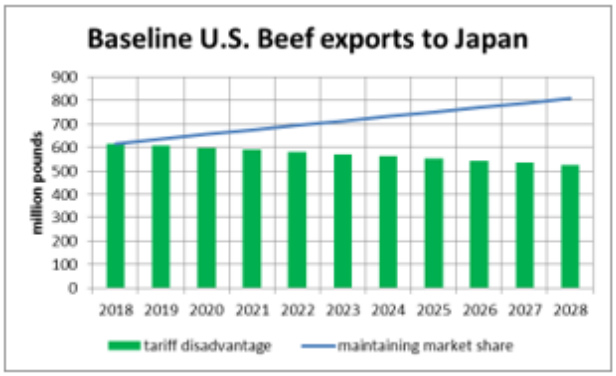
| Baseline Value of Meat Exports to Corn and DDGS 2018-2027 by State | | | |
|---|---|---|---|
| **State** | **Corn** | **DDGS** | **Total** |
| Iowa | $3,390 | $849 | $4,239 |
| Illinois | $2,863 | $361 | $3,225 |
| Nebraska | $2,190 | $455 | $2,645 |
| Minnesota | $1,926 | $255 | $2,181 |
| Indiana | $1,215 | $239 | $1,454 |
| South Dakota | $958 | $223 | $1,180 |
| Kansas | $893 | $100 | $993 |
| Ohio | $721 | $113 | $834 |
| Missouri | $719 | $52 | $770 |
| Wisconsin | $663 | $119 | $783 |
| North Dakota | $584 | $97 | $681 |

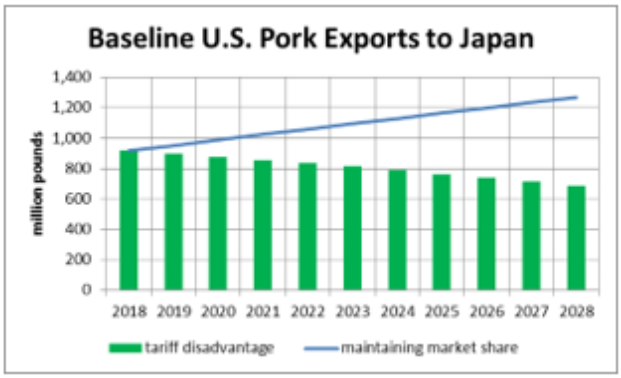
*Source: WPI, USDA*

# Importance of Maintaining Market Access

Japan is the most important market for U.S. red meat exports. It ranks first in value for both beef and pork, and first in volume for beef and second in volume for pork. However, without a trade agreement between the U.S. and Japan, meat exporters are at a disadvantage to other exporting nations – and that inequity will grow into the future. Australia now has a tariff advantage over the U.S. owing to its trade pact with Japan, and with the pending approval of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (TPP-11) and the Japan-EU Economic Partnership (EPA), U.S. beef and pork will face higher tariffs than imports from New Zealand, Canada, Mexico, Chile and the E.U. as well.

Without an agreement to restore equitable tariff rates and market access in Japan for U.S. beef and pork to that of competing exporters, the U.S. faces a significant loss in market share among beef and pork imports into Japan over the coming 10 years.




*Source: USMEF, WPI*

This loss in market share could directly impact the demand for more than 237 million bushels of corn and 1.006 million tons of DDGS. This volume of potential lost feedstuffs utilization has a projected value of between $1 billion and $1.5 billion.

| Potential 2017-2028 Loss of Value to Corn and DDGS from Tariff Disadvantage in Japan | | | |
|---|---|---|---|
| **Feedstuff** | **Pork** | **Beef** | **TOTAL** |
| **Corn** | 172.8 mln bu | 64.2 mln bu | 237 mln bu |
| **DDGS** | 282,867 tons | 724,000 tons | 1.006 mln tons |

*Source: USMEF, WPI, USDA*