

The logo features a stylized graphic of a green and blue arc, resembling a stylized 'A' or a crop, positioned to the left of the word 'AgReview'.

AgReview

February 2017

Volume 29, No. 1

World Perspectives, Inc.

Growing Optimism in Fertilizer

**NAFTA Renegotiation Threatens
Soybean and Meat Exports**

Sales, Policies Firm Farm Equipment Outlook

Technology Focus for U.S. Agricultural Policy



WORLD PERSPECTIVES: AG REVIEW

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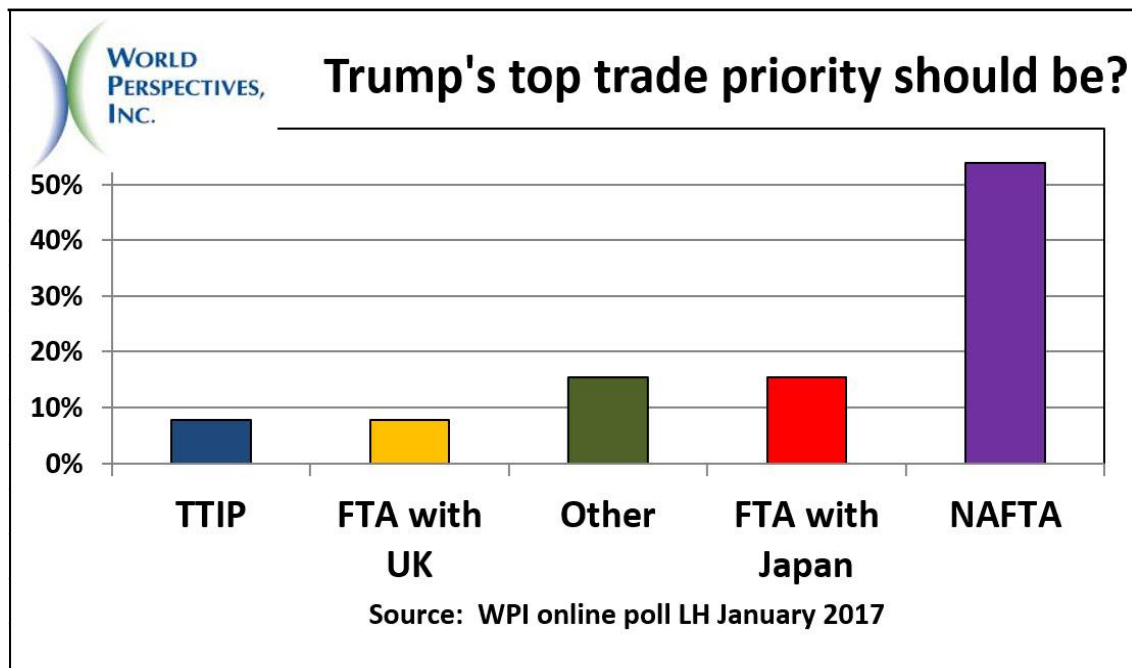
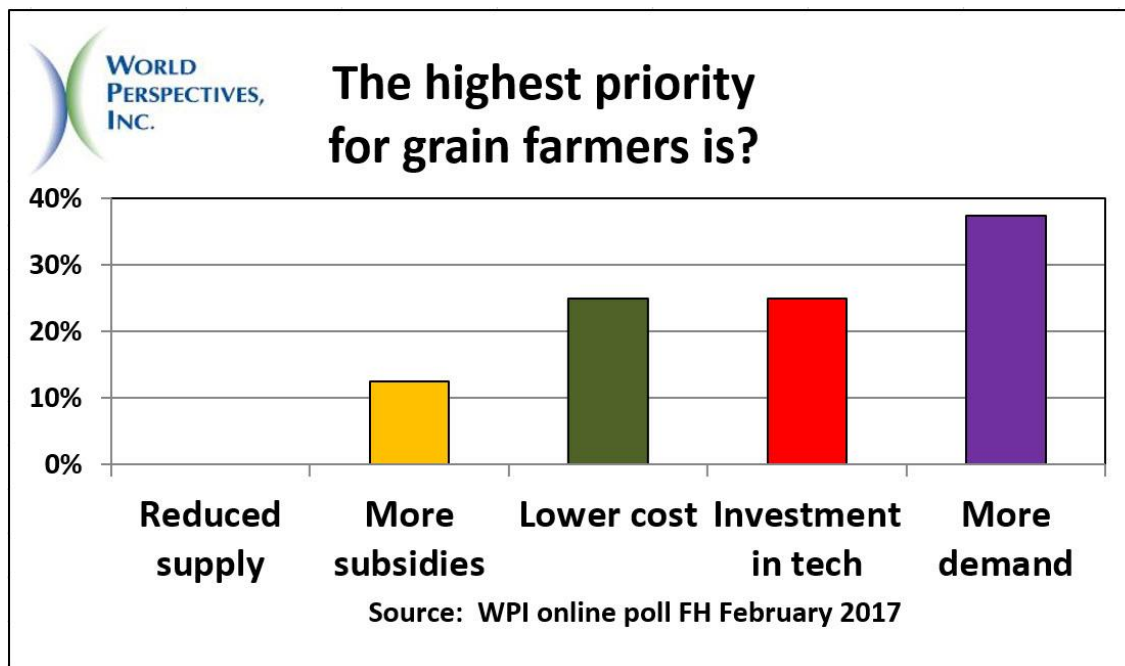
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WPI POLLING

Below are the results of two recent WPI polls. Visit www.worldperspectives.com to cast your vote in our current survey.

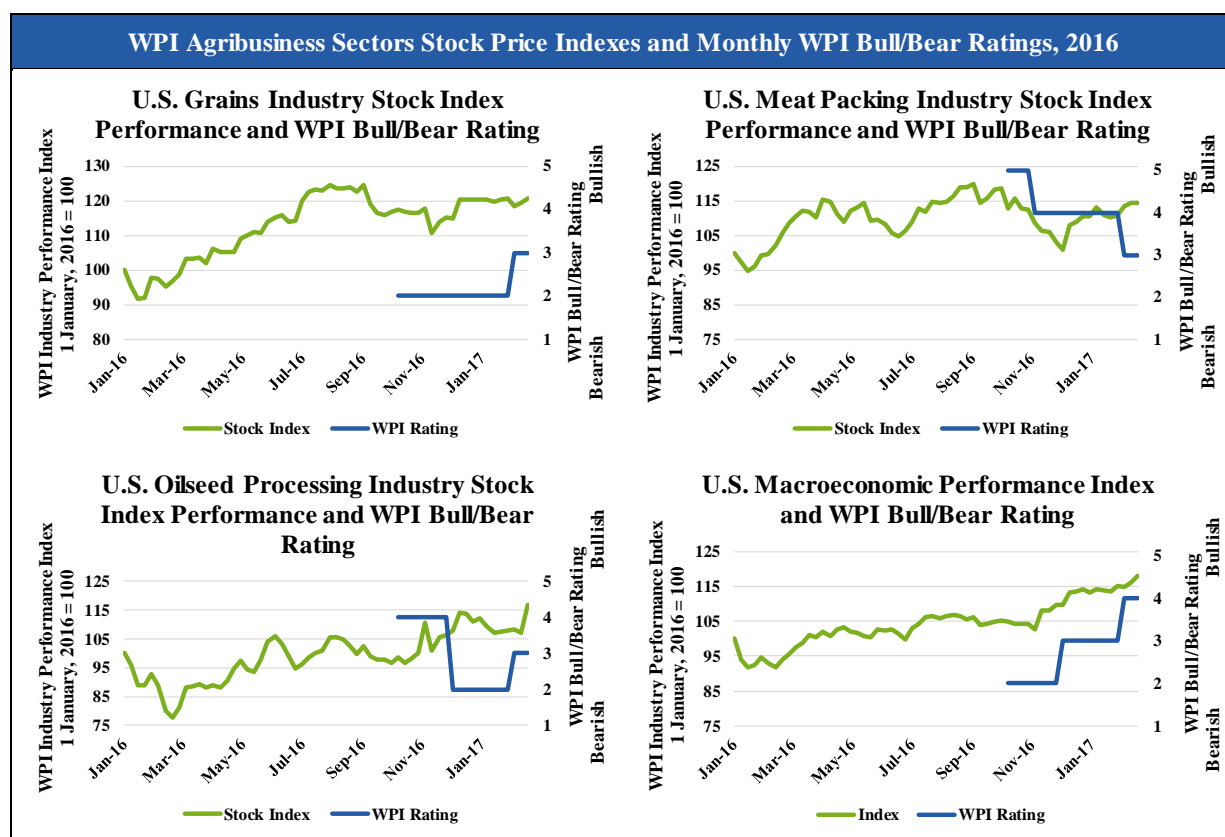


2016 AGRIBUSINESS PERFORMANCE RECAP AND 2017 OUTLOOK

By Matt Herrington

Forecasts are worthless without comparison. Unless they can be easily quantified and compared against the actual results, their worth is little more than the paper they are printed on. Since October 2016, WPI has been issuing forecasts on the performance of U.S. agribusiness subsectors. Rated on a 1-5 scale indicating the analysts' individual belief of how companies in the sector will fare, the WPI Bull/Bear Rating provides our forecast of whether the sector will

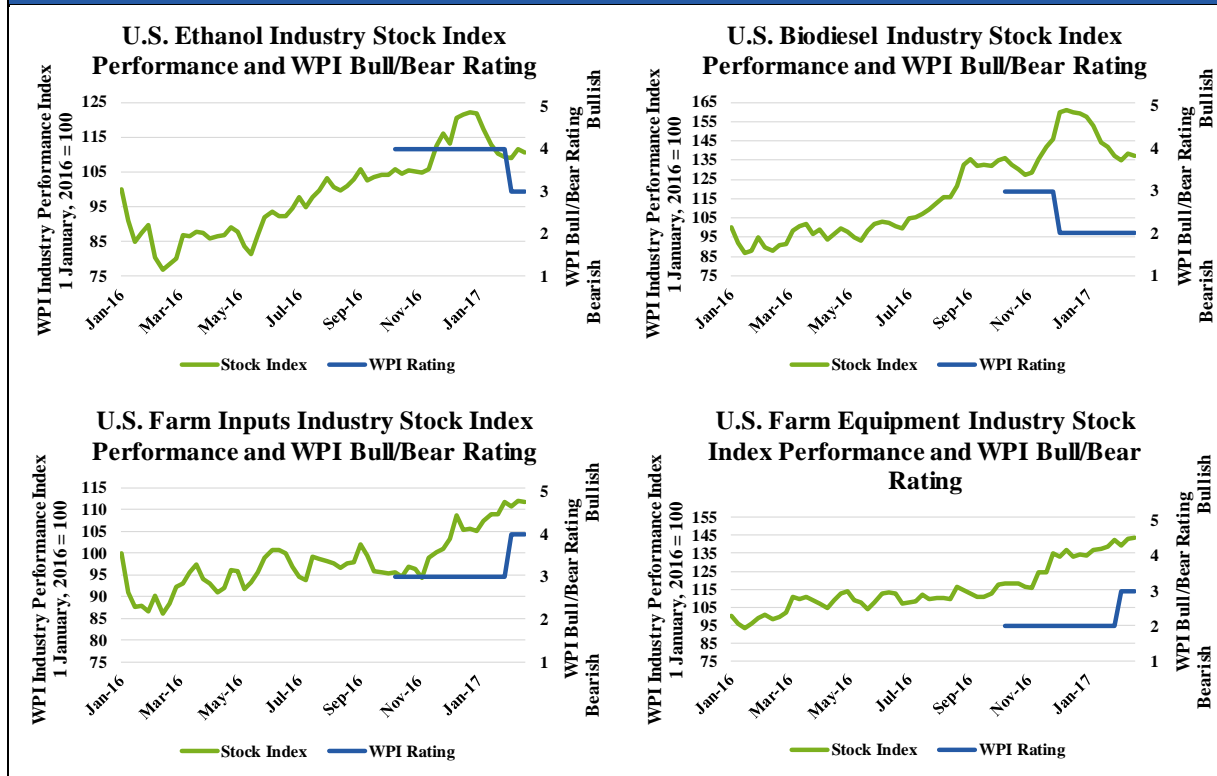
be under bullish, bearish or neutral price action. The first issue of *Ag Review* for 2017 starts with a look at the 2016 price performance of each agribusiness subsector covered in this publication and each analyst's monthly outlook. Some forecasts were quite accurate while others less so, and the following charts show WPI's self-assessment for calling industry-influencing trends within agriculture¹.



Source: WPI

¹ Editor's note: This article was published in place of *Ag Review*'s typical "Harvested Data" survey results section.

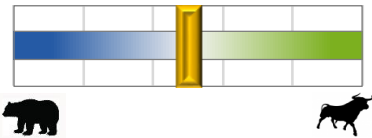
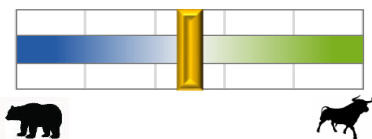
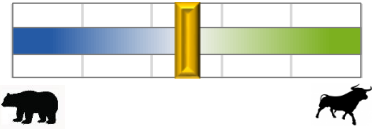
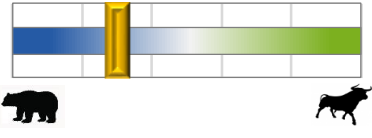
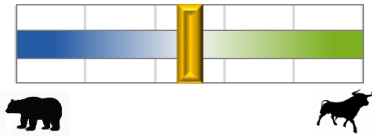
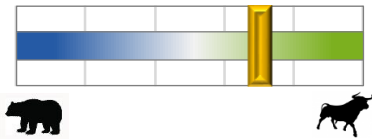
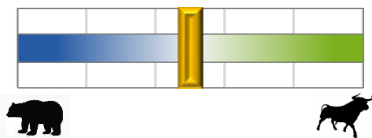
WPI Agribusiness Sectors Stock Price Indexes and Monthly WPI Bull/Bear Ratings, 2016, Continued



Source: WPI

WPI BULL/BEAR LEANINGS FOR AGRIBUSINESS IN 2017

By WPI Staff

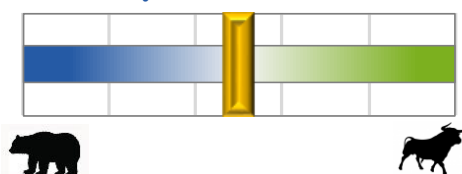
Industry	WPI Industry Bull/Bear Rating	Predominant Influencing Factors
Grains		<ol style="list-style-type: none"> 1) Large carryover supplies of corn and wheat are pressuring prices. 2) Record-large demand for U.S. corn and soybeans in 2016/17 gives marketing opportunities. 3) Record South American production will threaten U.S. exports. 4) Global 2016/17 ending stocks will be the largest on record. 5) Any significant drop in world supplies will be driven by a weather event.
Oilseeds		<ol style="list-style-type: none"> 1) Year-over-year growth in U.S. soybean exports 2) Probable reduction in South American production may be price-supportive. 3) Likely record soybean production in Brazil will pressure U.S. exporters. 4) Additional reductions in U.S. soybean ending stocks are likely. 5) Political risk to trade with Canada and Mexico could lower exports.
Biofuels		
<i>Ethanol</i>		<ol style="list-style-type: none"> 1) Uncertainty about Trump administration RFS actions may limit growth. 2) Possible, but not probable, reductions to 2017 RVOs may limit demand. 3) Falling DDGS prices are eroding ethanol producer margins.
<i>Biodiesel</i>		<ol style="list-style-type: none"> 4) The biodiesel blenders' tax credit expired and is not in effect for 2017. 5) This tax credit could be retroactively applied by Congress in 2017 but such action is clouded with uncertainty.
Livestock		<ol style="list-style-type: none"> 1) Low feed costs and herd/flock expansion will build 2017 meat supplies. 2) Larger kill numbers can help improve plant operating efficiencies. 3) International and domestic meat and poultry demand is holding up well. 4) NAFTA renegotiations cloud the outlook for meat and poultry exports.
Farm Inputs		<ol style="list-style-type: none"> 1) Northern Hemisphere spring planting has firmed fertilizer prices. 2) Crude oil/fertilizer price ratios suggest DAP prices are higher than normal. 3) U.S. nitrogen fertilizer production margins are improving with low natural gas costs.
Machinery		<ol style="list-style-type: none"> 1) Smaller tractors (<70 HP) sales are stronger than expected. 2) Focus on technology will bring on-farm efficiencies and grow demand. 3) New Holland's acquisition of Kongskilde Industries creates an even more competitive market place. 4) Caterpillar's revenues are growing in Asia-Pacific markets.

Policy Factors

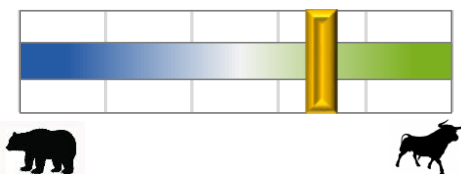
- 1) Macroeconomic growth is looking stronger.
- 2) Reduced regulatory burden and more business-friendly tax policies are likely.
- 3) Resilience is greater than acknowledged.
- 4) A trade war is the threat, but a trade deal (upgraded NAFTA) is the goal.

WPI Bull/Bear Ratings for Policy Factors Influencing Agribusinesses

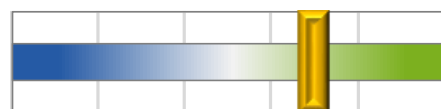
Trade Policy



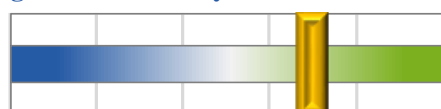
Food Policy



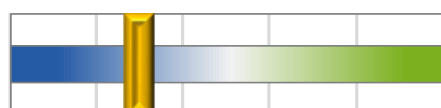
Macroeconomics



Agricultural Policy



Geopolitics



THE U.S. GRAINS INDUSTRY

By Robert W. Kohlmeyer

Top Five Reasons WPI is Neutral the Grains Industry

- Large supplies of U.S. wheat and corn will be carried over into the 2017/18 crop year.
- There will be record-large demand for U.S. corn in the 2016/17 crop year.
- Brazil and Argentina will harvest large corn crops that will compete against U.S. interests.
- Record-large world wheat ending stocks will be carried over into the 2017/18 crop year.
- Any significant world grain supply reduction will require a major crop production problem in one or more major producing countries.

With changes a near constant feature of the grain markets as well as the grain business in general, those involved with either are seldom bored. However, the nature of such or when they will appear are uncertainties that of course make it difficult to plan for them. In this sense, 2017 will likely prove to be quite typical. Adding to this is the still unfolding nature of the new administration of President Trump. Its potential macro impact on the U.S. economy and apparent “America First” protectionist trade policies suggest perhaps the safest prediction for the changes to come this year is that they are likely to be very significant for the grain business.

The Trump administration’s macro-economic and trade policies will be very important, to be sure, but the entire grain business (from the farmers to grain handlers, processors, exporters, food manufacturers, retailers and consumers) must also face more parochial factors. The issues and pressures raised by the fundamental relationships between the volume of grain supplies and demand will ultimately direct crop values and those of products derived from crops. In turn, these relationships will affect the level of demand throughout the entire grain marketing chain.

If the 2016/17 crop cycle ends with the U.S. holding large stocks of grain and soybeans, what is in store for 2017/18? Current new crop prices are showing soybeans priced 2.6 times higher than corn. The traditional price equilibrium point between the two has soybeans priced at about 2.4 times more than corn; thus, the current price ratio is seen as encouraging farmers to plant more soybeans and less corn in 2017 than in 2016. Moreover, after calculating the costs of inputs, the current low new crop corn prices project a negative return for many U.S. farmers, whereas current new crop soybean prices project a small positive margin after production costs.

As a result of the current soybean/corn comparison, it is widely expected that U.S. farmers will plant about 3 million fewer acres of corn and 2-3 million acres more soybeans in 2017 than last year. That would put potential corn plantings somewhere around 91 million acres and those of soybeans near 87 million acres. The extraordinary record corn and soybean yields of 2016 are not expected to be matched again in 2017. However, assuming

A 4-billion-bushel soybean crop and 14.5-billion-bushel corn crop are not unreasonable expectations for the 2017/18 crop year.

normal spring and summer weather conditions and trend yields, a 4-billion-bushel soybean crop and a 14.5-billion-bushel corn crop are not unreasonable expectations for 2017. While not as

large as 2016's record crops, such production levels would still place them among the largest on record and ensure that supplies of each would be ample to meet expected demand.

The U.S. wheat situation for 2017/18 will be quite different. In its January report on winter wheat plantings, USDA estimated that acreage at 32.4 million acres, the smallest since 1909. U.S. winter wheat prices were so low during 2016 that it was nearly impossible for these U.S. growers to avoid losing money on their production. Spring wheat farmers have fared somewhat better, but the expectation is that this acreage will not increase much, if at all, from 2016. Soybeans, which are offering farmers a more profitable alternative to wheat, will limit any acreage gains for spring wheat. Currently, the total planted area for all classes of wheat is expected to be no more than 47 million acres and possibly less. That would be down more than 3 million acres from 2016 and about 8 million from 2015.

As a result, total U.S. wheat production in 2017/18 may not exceed 1.85 billion bushels, which would be about 500 million bushels less than in 2016/17 when a new record average yield was set. Such a drastic reduction would seem to result in much higher wheat prices, but it is unlikely this scenario will occur. Because of lower wheat prices usually available from other exporters such as the Black Sea region, Europe, Argentina, Australia and Canada, U.S. wheat prices have typically been irrelevant to the world wheat market in recent years. Wheat production prospects elsewhere in the Northern Hemisphere appear quite good at this point in the crop cycle, and U.S. wheat may once again be priced out of much of the world wheat trade during 2017/18. Accordingly, it will essentially be priced based on domestic considerations. There will be times when world wheat values are priced differently enough from U.S. domestic values as to seem like an entirely different commodity.

Large beginning U.S. wheat stocks and potentially reduced exports would mean that even with the expected very small wheat production, U.S. 2017/18 ending stocks may not decline much, if at all. Moreover, it appears that another large world wheat crop is on the way, although it

might not quite match the 2016/17 record. If so, there will be little or no reduction in the large, burdensome world wheat stocks to be left at the end of 2016/17.

Unless adverse weather causes substantially reduced corn production in the U.S. or other large corn-growing areas, the world should also still be abundantly supplied in 2017. Large corn crops will be harvested in Brazil and Argentina during April-June, and stocks from those countries will provide stiff export competition for U.S. origin for the rest of the year. U.S. corn exports during 2017/18 are not likely to be as large as in 2016/17, and this should make additional supplies available for domestic consumption if needed and keep relatively large ending stocks for that year.

Grain processing activities are likely to produce mixed results in 2017. Wheat millers will probably face greater logistical challenges as they make do with a historically small U.S. wheat crop. However, they process wheat to fill domestic flour demand, which will probably remain flat in 2017. Flour exports are not large enough to be a factor. Thus, the separation between U.S. domestic wheat values and world wheat values, odd though it may seem at times, should have little effect on flour milling. It is a historically low margin business in the U.S., and there is little reason to expect improvement in 2017. In fact, difficulties in managing the processing of a small, geographically-dispersed wheat crop may actually cause some erosion in milling margins.

Grain processing activities are likely to produce mixed results in 2017.

Ethanol producers had generally positive margins in 2016, helped by a rather sharp improvement toward the end of the year as prices fell below gasoline prices and led to some discretionary blending. There was also an increase in U.S. ethanol exports, primarily to Brazil and China, which helped keep ethanol plants running near capacity. Margins have tailed off some in early 2017 under the influence of volatile energy markets and a modest rally of corn prices, but

they remain positive for at least now. Domestic demand for ethanol in 2017 should be unchanged to perhaps slightly higher unless there is a revision to the Renewable Fuel Standard (RFS) or the way it is applied. However, export demand for U.S. ethanol may falter in 2017 because Brazil will likely boost production, thereby reducing its import demand. Given its large corn stocks and low domestic corn prices, it is too early to know whether China will allow unfettered imports of ethanol in 2017. However, it has virtually eliminated imports of ethanol byproducts by imposing a punitive import tariff in an effort to support domestic corn prices, and some sort of move to limit ethanol imports would fit that pattern.

One enormous unknown in 2017 is how the new Trump administration's policies on the economy, trade, taxes, regulations and foreign affairs will impact the business of grain. President Trump has already pulled the U.S. out of negotiations for a Trans-Pacific Partnership (TPP) trade agreement, and he threatens to renegotiate NAFTA with Canada and Mexico. He has provoked Mexico

and China, the largest importers of U.S. corn and soybeans, respectively, and has threatened trade actions against them that would surely elicit reprisals. His administration has started out supporting protectionist themes and ideas.

President Trump has promised expansionary economic policies and government expenditures to the point that many economists expect a noticeable uptick in the inflation rate. This trend toward "reflation" is already enticing managers of speculative money pools to start building long positions in commodities, including agricultural products. Managed fund participation in grain futures markets is likely to grow during the coming year.

Exactly how the policies of the Trump administration sort out and how they will affect the grain business is impossible to predict now, but that there will be some impact seems a certainty. This is probably the biggest of all the unknown variables that face grain markets and grain businesses.

OILSEED PROCESSING

By John Baize

Top Five Reasons WPI is Neutral the Oilseed Processing Industry

- Reductions in 2016 U.S. soybean production and 2016/17 ending stocks are price supportive.
- U.S. exports and unshipped sales are up 20 percent and 32 percent, respectively, from last year.
- Flooding in Argentina is likely to reduce that country's 2017 production by 3-5 MMT.
- Brazil is on track to produce a record crop in 2017, but dryness lingers in 15 percent of the growing area.
- Trump's trade policies may jeopardize future exports to China and Mexico.

The biggest January news for the soybean sector involved weather concerns in South America and growing anxiety that the Trump administration's trade policies will result in export disruptions. Soybean price action remained positive for farmers, and the pace of U.S. soybean exports continued to exceed that of a year earlier.

The market also received some help from USDA, which lowered its estimate for the 2016 U.S. soybean crop by 54 million bushels (1.47 MMT) to 4.307 billion bushels (117.208 MMT). The reduction was a result of decreased 2016 yield estimates that fell from 52.5 bushels/acre to 52.1 bushels/acre. USDA reduced its forecast for U.S. ending soybean stocks by 60 million bushels (1.63 MMT) to 420 million bushels (11.435 MMT), a 37-day supply. The change was bullish for soybean prices and led to major increases in speculative long positions in soybean futures.

U.S. soybean exports in MY 2016/17 as of 19 January 2017 were 20 percent above the pace of the previous marketing year while outstanding export sales were 32 percent higher. This more than offset the 8.7 percent decline in soy meal exports thus far. Moreover, USDA's 1 February announcement of large soybean export sales suggests more sizable ones may be forthcoming.

The soybean market's weather concerns were focused on Argentina. A substantial portion of the key soybean-growing areas there had major floods between Christmas and the New Year as well as during 14-15 January. Those most severely impacted were in the provinces of Cordoba, Santa Fe, northern Buenos Aires and Entre Rios. Observers estimate as many as 2 million hectares were subjected to soil-saturating rains with up to 950,000 hectares under water. Young soybeans that were inundated were mostly lost for the year as the flooding came too late for replanting, and soybeans affected by heavy rains have been stunted by soil saturation. Analysts have estimated losses at 3-5 MMT with the crop mostly estimated now at no more than approximately 50-53 MMT versus 56 MMT before the flooding.

The weather in Brazil was much more favorable in January. By all accounts, the soybean conditions in most of Mato Grosso (the major soybean-producing state) were quite good. However, too little rainfall was received in northeastern Brazil and some areas of Mato Grosso do Sul. Although analysts estimated about 15 percent of the country's soybean area was suffering from a lack of moisture in late January, they still pegged the Brazilian soybean crop at around 103-104 MMT. As of the last weekend in January, the harvest was only 4.3 percent completed. It was delayed in Mato Grosso by nearly daily rainfall and only 12.4 percent

finished. Meanwhile, the harvest in Parana, the second-largest producing province, was 1 percent completed versus 9.2 percent a year ago.

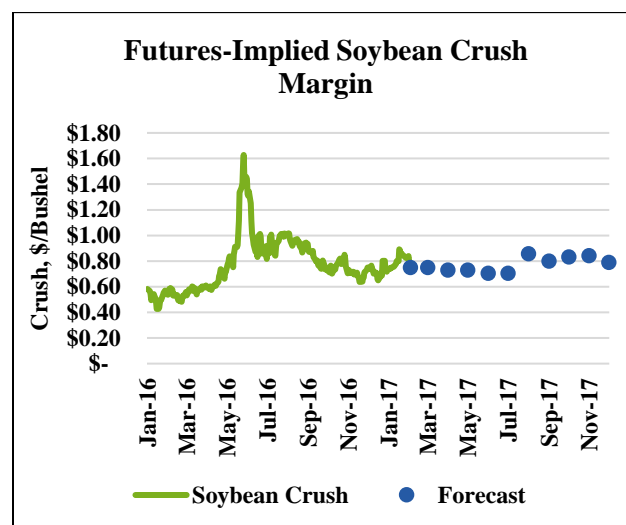
If the persistent rains continue in Mato Grosso and neighboring states, possible yield and quality losses will be a concern. That was the result in years past when too much rainfall was received during the harvest period in years past, causing mature soybeans to sprout in the pods. Although that has not occurred thus far this year, it is a possibility. The persistent rains also prevent farmers from effectively controlling Asian soybean rust in later maturing soybeans, thereby also boosting the potential for yield losses. Increased incidents were being reported in late January.

The pace of Brazil's soybean harvest has disappointed exporters who expected it to be finished sooner based on an early planting. On 31 January, the ship lineup awaiting loading at Brazilian ports had a combined capacity of 4.39 MMT, 97 percent greater than a year earlier. If the harvest continues to be delayed by rain, exporters stand to pay hefty demurrage charges for the ships waiting to load.

The reduction in U.S. soybean ending stocks and the loss in Argentine production more than offset USDA's higher forecast for Brazilian soybean production of 104 MMT, a 2 MMT increase. The result was USDA lowered its estimate of global soybean stocks on 31 August 2017 from 82.85 MMT to 82.32 MMT. However, that will very likely be further decreased in February when USDA is expected to substantially reduce the forecast for Argentina's 2017 soybean crop from its January estimate of 57 MMT.

U.S. processors continue to make reasonable margins with the January soybean crush volume totaling 169 million bushels (4.6 MMT), 2.1 percent below the November volume and 1.3 percent less than in December 2015. Domestic soybean demand is moderate, and recent soybean exports have been good after a lackluster start to the marketing year. With the Brazilian

soybean crop now being harvested, however, export demand will probably slow except for nearby markets. At this point, U.S. soybean processors can be expected to see moderate soybean crushing and refining margins for the rest of the marketing year. Moreover, U.S. crushing will likely continue at margins exceeding those of Argentine firms. The crush volume will decline, though, as it normally does in the spring and summer when domestic soybean demand slows with warmer weather.



Source: CME Group, WPI

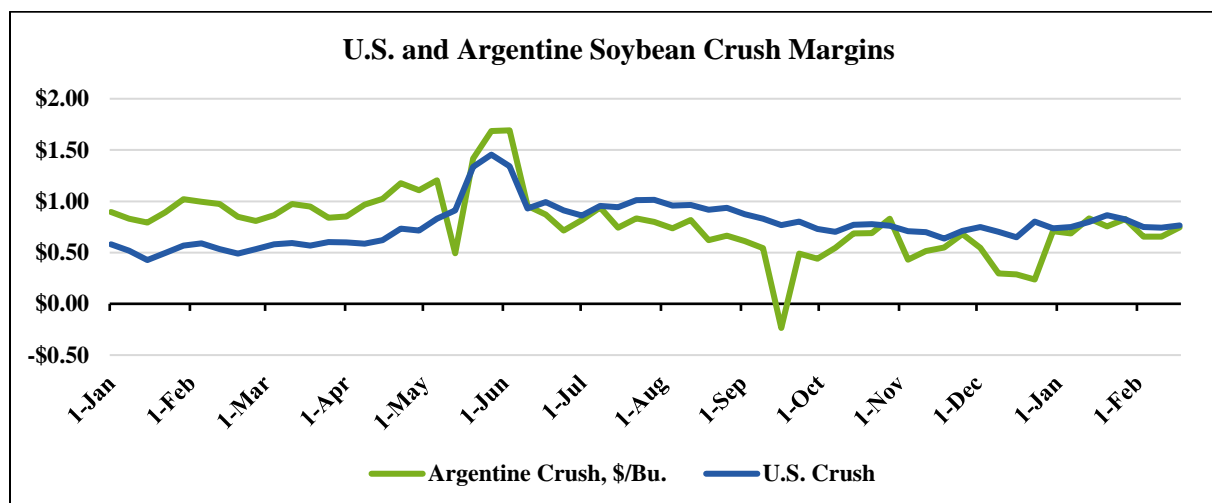
The soybean market also remains somewhat jittery because of the potential for the Trump administration to pursue trade policies that will endanger U.S. soybean exports. At greatest risk are those sales to China and Mexico. China is by far the world's largest soybean importer with imports of 83.2 MMT in CY 2016. The U.S. shipped 30.381 MMT (1.116 billion bushels) there in MY 2015/16 or 57.7 percent of total U.S. soybean exports.

Mexico is the second-largest destination for U.S. soy exports with a total 3.586 MMT (131.7 million bushels) of soybeans, 2.191 MMT of soybean meal and 0.247 MMT of soybean oil in MY 2015/16. NAFTA has allowed the U.S. to capture almost all of that market, but this advantage would be lost if Mexico drops out of the agreement.

There is no reason to believe U.S. soybean crushing margins will fall below moderate levels in 2017.

It currently seems unlikely that the Trump administration will do anything to seriously jeopardize U.S. exports to China or cause Mexico to drop out of NAFTA. Both countries need the U.S. market, and those exports are important to the U.S. economy. However, this clearly must be closely monitored in the future.

The next three months will be very important in determining the direction of future soybean prices. The size of the South American soybean crop will be known by 1 May as should the volume of soybeans planted by U.S. farmers. In addition, the direction that the Trump administration will pursue on trade should also be more apparent.



Source: DTN, WPI

THE U.S. BIOFUELS INDUSTRY

By Dave Juday

Top Five Reasons WPI is Neutral Ethanol, Bearish Biodiesel

- There is uncertainty regarding the Trump administration's outlook on the RFS.
- Ethanol production is reaching record highs, but weak DDGS prices are eroding margins.
- Maintaining ethanol exports is critical for avoiding inventory buildup and price declines.
- The biodiesel blenders' tax credit has expired and is not in effect for 2017.
- In past years, the blenders' tax credit has been applied retroactively, but congressional tax reform efforts cloud this possibility with uncertainty.

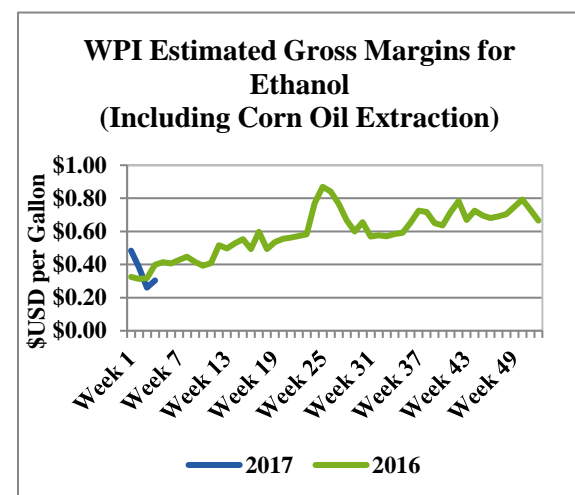
Biofuels has a good year in 2016. First, the U.S. Environmental Protection Agency (EPA) released the final 2016 Required Volume Obligations (RVOs) on time in November 2015, the first time the agency had met the statutory deadline since 2009. The timely announcement put the annual process back on schedule, simplifying the compliance year for producers and blenders alike. Moreover, the U.S. set records for both ethanol and biodiesel production last year at 14.95 billion gallons and 1.814 billion wet gallons, respectively.

For 2017, the EPA issued the final RVO rule in November 2016, increasing the final volumes from the proposed level issued in May 2016. While the biodiesel volume was held steady at 2 billion gallons, the implied ethanol mandate was raised by 500 million gallons, and the overall advanced category was also increased. The boost in the overall advanced category will benefit biodiesel, which is a qualifying advanced biofuel.

On top of record production, gross operating margins remained positive through 2016. The weekly average for ethanol last year was \$0.59/gallon, well above the \$0.36/gallon margin the sector experienced in the first four weeks of 2017. However, the year-to-date average gross margin in 2017 remains slightly higher than the \$0.34/gallon for the same period last year.

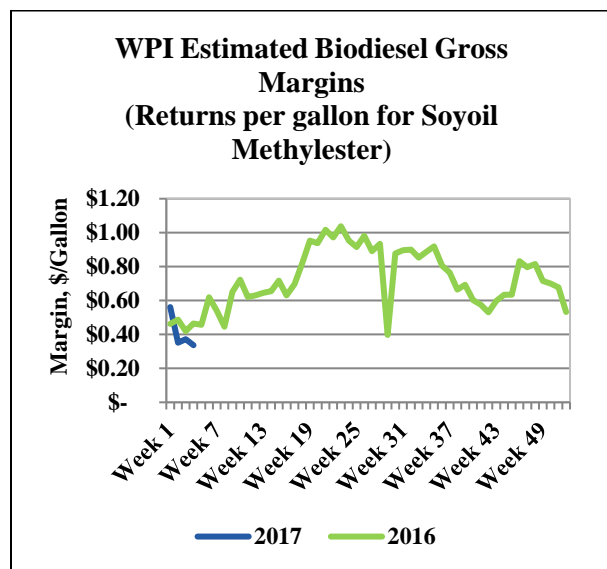
Required Volume Obligations (billion gallons)			
	2016 Final	2017 Proposed	2017 Final
Total Renewable Fuel	18.11	18.80	19.28
Overall Advanced	3.61	4.00	4.28
Biomass-based Diesel	1.90	2.00	2.0
Cellulosic biofuel	0.230	0.311	0.311
Implied Conventional (corn ethanol)	14.50	14.80	15

Source: EPA, WPI



Source: USDA, WPI

The weekly average gross margin for biodiesel last year was \$0.72/gallon, also well above the \$0.41/gallon margins that the sector experienced in the first few weeks of 2017. For the first four weeks of 2016, the average gross margin was \$0.46/gallon.



Source: USDA, WPI

Looking ahead in 2017, however, both ethanol and biodiesel have some challenges to overcome if they are to repeat their performances in 2016. Moreover, the biofuels sector will also have to navigate some political uncertainty from potential RFS reform to the fate of the biodiesel blenders' tax credit.

The biofuels sector will navigate some political uncertainty ranging from potential RFS reform to the fate of the biodiesel blenders' tax credit.

RFS Uncertainty

On Inauguration Day (20 January), President Trump issued a presidential memorandum directing all agencies to freeze new regulatory rulemaking and delay for 60 days all regulations published in the Federal Register that had not gone into effect. That delay included the final 2017 RVO rulemaking, which now has an

effective date of 21 March 2017. This sets back the progress that the EPA made in getting the RFS timeline back on track. The bigger impact, however, was that the news caused anxiety in the biofuels market about possible downward revisions in the 2017 volumes, which accordingly sent Renewable Identification Number (RIN) prices plummeting. Such a regulatory freeze is a common action for a new administration; similar ones were enacted by both the Obama and Bush administrations. The purpose of a regulatory freeze is to allow the status quo to continue while the new personnel at the federal agencies get up to speed.

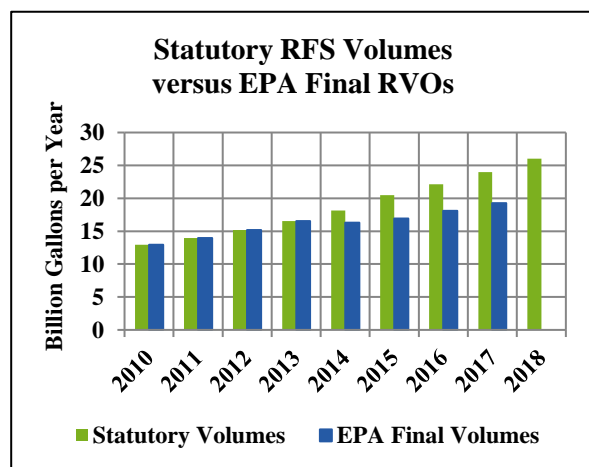
The Trump memo directed acting department heads to review pending regulations for "... questions of fact, law, and policy they raise." This delay and review does indeed introduce the possibility of revisions to the 2017 RVO. Moreover, the biofuels sector's concern over such an adjustment is heightened given that Scott Pruitt is the new administrator of the EPA. Formerly the attorney general of Oklahoma, Pruitt had long been a critic of the RFS and the EPA's administration of it. The most probable scenario, however, is that the EPA will not adjust the final 2017 volumes in light of the political mess such a move would cause. There is a reasonable expectation, though, that the 2018 volumes to be proposed in May or June of this year may be scaled back from the growing trend line they have been on. Any reduction in the 2018 RVOs will hang over the market in 2017.

Another unknown that plays into the 2018 volume standards is a case pending in

Any reduction in the 2018 RVOs will hang over the market in 2017.

the D.C. Circuit Court of Appeals. It was brought by a number of biofuels interests and challenges the Obama EPA's use of its waiver authority under the 2007 Energy Independence and Security Act. The EPA used that authority to reduce the advanced and overall volume totals, as provided by the statute, by waiving the applicable statutory volumes due to an "inadequate domestic supply." The agency interpreted the "inadequate domestic supply"

waiver authority to apply to a shortage of motor fuel in which biofuels could be blended. That inventive interpretation triggered the lawsuit from a number of parties in the biofuels industry who contend that the waiver authority applies only to biofuels. The suit is expected to be decided by the summer of 2017. If the court rules in favor of the EPA, it would have a legal green light to reduce the 2018 volumes, which would hang over the biofuels sector through the end of 2017. However, a court decision against the agency would result in a reinstatement of statutory levels, which would almost certainly spark congressional interest in RFS reform. Reform discussions would be likely as many have deemed the statutory volumes to be unachievable, and a return to them would almost certainly raise RIN prices to levels that would be bullish for the retail fuel prices.



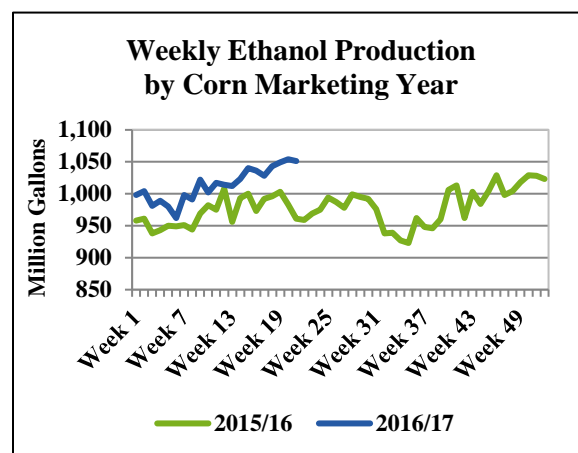
Source: EPA, WPI

Congressional attention is always drawn to high fuel prices as happened in 2013 when the House Energy and Commerce Committee started to look at RFS reform options. That stopped when the EPA pledged to use its waiver authority to reduce RIN prices by ultimately applying the “inadequate domestic supply” waiver.

Ethanol

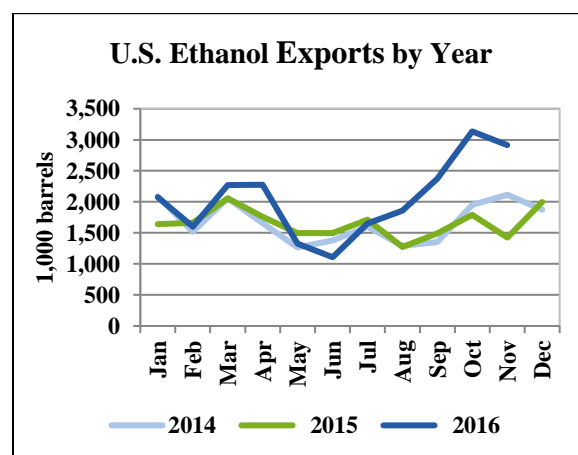
Ethanol production closed 2016 with another weekly production record averaging 1.043 million barrels/ day, according to the U.S. Energy Information Administration (EIA). It was the 10th week in a row that production averaged

more than 1 million barrels/day. Through 20 January, that pace was maintained, pushing year-to-date ethanol production for the 2016/17 corn marketing year up 4.5 percent from the prior year and on trend to exceed 15.5 billion gallons.



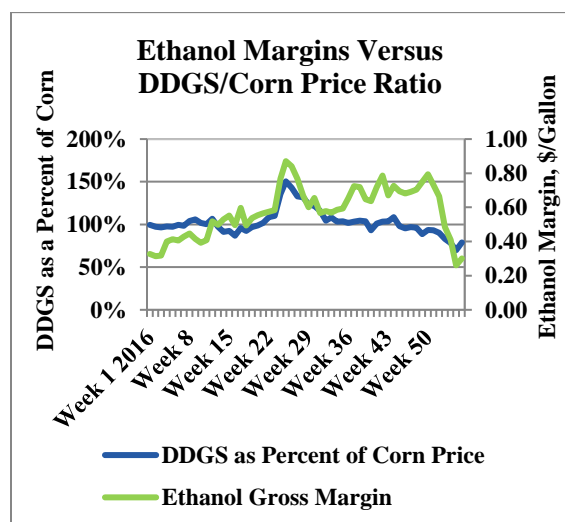
Source: USDA, WPI

The torrid pace of exports since mid-2016 has partly provided support for the entire year’s strong ethanol margins. For MY 2016/17, ethanol exports are up 85 percent over the same period in the previous marketing year. They are increasing to Canada, Brazil and China, which re-entered the market in September after sitting out most of the summer. Notably, however, China’s December ethanol imports fell 31 percent on the year as declining corn prices helped spur domestic production of ethanol there. The challenge for the industry will be to sustain those exports through 2017.



Source: EIA, WPI

Another China factor for the U.S. ethanol sector is that country's DDGS import volumes. In December, its imports of U.S. DDGS fell 83.3 percent year-over-year based on more affordable domestic corn and domestically-produced DDGS as the Chinese ethanol sector rebounds. DDGS are an important factor in the net return of ethanol production. Driven largely by the change in Chinese demand, the price of DDGS per ton as a percentage of the price of a ton of corn has dropped from a peak of 150 percent to less than 80 percent. The chart below shows the impact of DDGS prices on ethanol mill margins. Maintaining profitability in the ethanol sector in 2017 is going to rely more than ever on successful marketing of ethanol's co-product, DDGS.

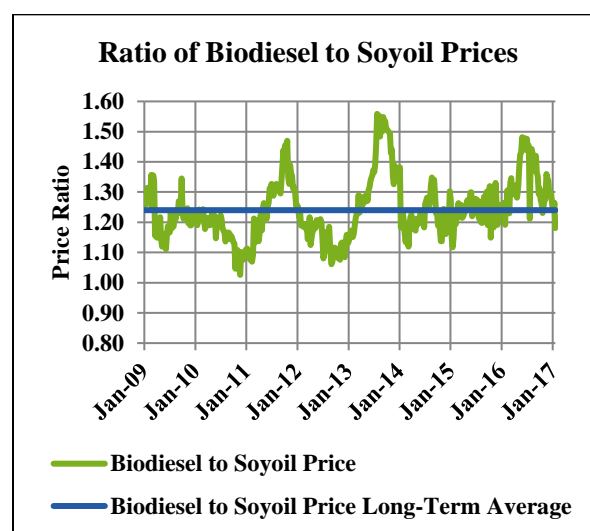


Source: EPA, USDA

Biodiesel

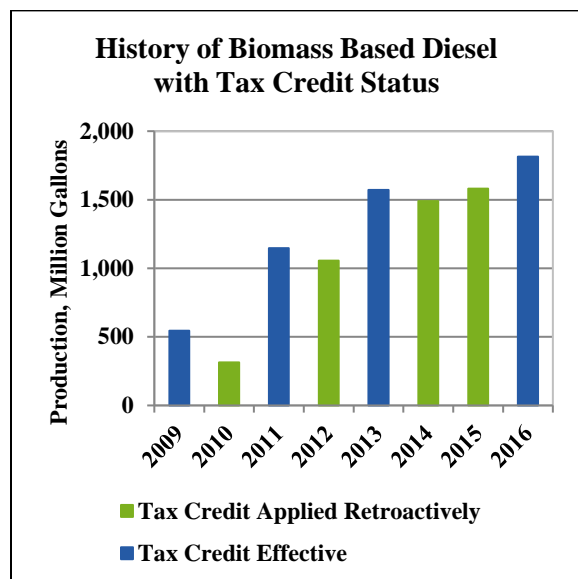
The biggest difference between 2016 and 2017 for the biodiesel sector is the absence of the \$1 per gallon blenders' tax credit, which expired 31 December 2016 and directly impacts its profitability. When the credit is in place, blenders bid up biodiesel prices to secure the value of the credit. Indeed, 2016 showed the same pattern as 2011 and 2013, years when the

credit was due to expire. Then the price of biodiesel was bid up at the end of the year and dropped off in the next year once the credit expired. As of the week ending 27 January, the ratio of biodiesel to soyoil prices was 1.19 versus a 2016 average of 1.31 and a long-term average of 1.24. All other things being equal, when the price is bid up by buyers, production of course increases. According to the National Biodiesel Board, "There is a clear correlation between the tax incentive and increased biodiesel production" When the credit was established in 2005, biodiesel production totaled approximately 100 million gallons.



Source: USDA, WPI

The history of the biodiesel blenders' credit is complex. After initially expiring in 2009, it has been intermittently extended and applied retroactively during four of the past seven years. The chart below shows the history of biomass-based diesel and the status of the tax credit.



Source: National Biodiesel Board, WPI

Typically in years when there is no effective tax credit, marketing contracts between producers and blenders include a provision to share the value of the tax credit on a negotiated basis should it be applied retroactively. However, history shows that without the biodiesel blenders' tax credit, both margins and production decrease. The sector is beginning 2017 without it, and the fortunes of the biodiesel sector weigh heavily on its fate.

History shows biodiesel production and margins decrease without the blenders' tax credit, and 2017 is starting without the credit.

The odds of re-instating the tax credit are unclear. When Congress takes up the 2018 budget resolution later this year, the final version is expected to include a reconciliation provision that will instruct the House Ways and Means Committee and Senate Finance Committee to craft a comprehensive tax reform plan. Under a budget resolution, congressional authorizing committees are usually left to their own devices to make policy changes that are in keeping with the budget. Reconciliation, however, is when the budget resolution specifically directs a committee (or committees) under binding legislation to

submit legislation that changes existing law in order to bring spending or revenues into line with the budget resolution. Reforming the tax code – with the implicit goal of reducing marginal tax rates – will require offsetting revenues from eliminating tax expenditures brought on by various existing deductions, exemptions and credits. This weighs against an extension of the blenders' credit.

The politics of the tax credit are also complex. Biodiesel producers have been pushing a reform to transfer the credit from blenders to producers. This would benefit domestic producers and penalize biodiesel imports into the U.S. However, imports are necessary in order to meet the 2017 and 2018 RVOs for biodiesel (under the RFS, the biodiesel RVO must be established 30 months in advance, so it is already set for 2018 at 2.1 billion gallons). Under the expanded biodiesel volume in 2016, U.S. biodiesel production was up about 20 percent for the year, but imports were also up 41 percent and are growing faster under the higher biodiesel volumes.

Even some within the biodiesel industry have some misgivings about the change. The concerns include the potential trade issues it could create with current exporting nations as well as the potential to cause the EPA to be less aggressive in setting the biodiesel portion of the annual RVO by effectively disincentivizing imports. Without them, the EPA could consider the potential supply of biodiesel to be constrained, leading to a less robust volume obligation. Under the statute, the EPA is required to set the annual biodiesel volume at 1 billion gallons and has the discretion to increase it further depending on supply. Thus, the EPA could reduce the biodiesel volume by half from the 2-billion-gallon mandate currently in effect without resorting to its waiver authority.

At this point, a proposal to change the tax credit from applying to blenders to producers has not gained critical momentum in Congress. Representative Kristi Noem (R-South Dakota) introduced legislation in the House last May to change the credit, and Senator Charles Grassley (R-Iowa) introduced a companion bill in July in the Senate. At the end of the last congressional session, Noem's bill had 15 co-sponsors, picking

up the last one on 6 September. Grassley's bill had 14 co-sponsors, adding none since the bill's introduction. While Noem and Grassley are on their respective tax-writing committees, this is not a priority of the chairmen given the goal of tax reform. Moreover, only two of the 39 House Ways and Means Committee members are co-sponsors of Noem's bill, and only three of 26 Senate Finance Committee members are co-sponsors of the Grassley bill. While both Noem and Grassley are majority party members, more than a third of their co-sponsors are minority party members. Although support for the proposed producers' credit is lacking at this point, the proposal has also splintered the support for extending the blenders' credit.

THE U.S. LIVESTOCK INDUSTRY

By Dave Juday

Top Four Reasons WPI is Neutral the Livestock Industry

- Lower feed costs will drive herd and flock expansion, resulting in more meat and poultry production in 2017.
- Larger kill numbers can help improve plant operating efficiencies.
- Demand for meat and poultry is holding up in both domestic and international markets.
- Maintaining robust exports is the risk to a positive outlook on the sector, but the planned renegotiation of NAFTA puts a cloud of risk over the red meat sector.

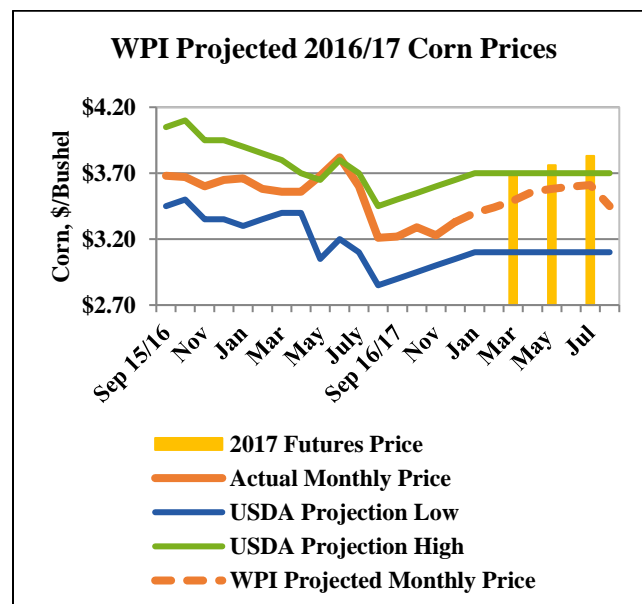
Last year saw record pork production, higher-than-expected beef production and a small increase in broiler production. For 2017, beef production is projected to grow another 4.5 percent on top of last year's more than 5 percent gain. Large calf crops in 2015 and 2016 essentially lock in increases through 2018 even if cattle liquidation occurs this year. Indeed, based on the USDA's January Cattle Inventory report, 2017 starts off with more feeder cattle outside of feed yards than there has been for five years. Pork production is projected to rise based on the increase in the September-November pig crop and producer intentions to boost farrowings in early 2017. This herd growth will hit the pork supply pipeline in the second half of 2017 when new hog slaughter capacity is expected to come on line. Finally, broiler hatchery data shows that broiler meat production is also expected to increase slightly, at least in the first half of 2017. Total red meat and poultry production is expected to reach 87.727 billion pounds, a 2.3 percent gain.

Helping to balance this supply growth is a projected increase in demand. USDA is forecasting total per capita domestic consumption of red meat and poultry this year at 217.7 pounds, up from 214.3 pounds in 2016 and 210.8 pounds in 2015. Moreover, exports for all red meat and poultry are projected to rise 5 percent from 14.879 billion pounds to 15.625 billion pounds.

Total domestic and export consumption of both is forecast by USDA to grow 1.943 billion pounds or 2.3 percent in 2017.

Feed Outlook

Cattle feeders, pork producers and poultry integrators should all continue to enjoy low-cost corn through the rest of the corn marketing year as the average price should remain below that of MY 2015/16, although it will seasonally trend upward.



Source: USDA, CBOT, WPI

With lower corn prices, the feed price ratio for each species is expected to improve slightly next year.

Comparison of USDA Estimated Feed Price Ratio 2016- 2017			
	2016	2017	Description
Steer/Heifer to Corn	33.1	32.1	# bushels of corn equal to 100 lbs. live weight
Hog/Corn	13.6	13.2	# bushels of corn equal to 100 lbs. live weight
Broiler/Feed	4.8	4.7	Lbs. of broiler feed equal to 1 lb. live weight

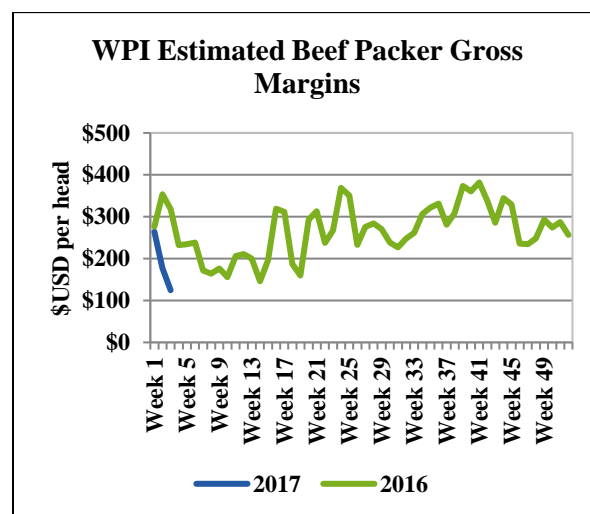
Source: USDA, WPI

Beef cattle feed margins will also benefit from lower DDGS prices, which fell early this year. Broilers, however, gain the least under the projected feed price ratio. The formula used by USDA for calculating the broiler/feed ration is based on 58 percent corn and 42 percent soymeal. The relative strength of soymeal compared with corn explains the smaller drop in the feed price ratio for broilers. USDA is forecasting soymeal prices in 2017 to be in the \$305-345/ST range with a mid-point roughly equal to last year's \$324.56/ST season average. It projects corn prices will be in the \$3.10-3.70/bushel range with a mid-point below last year's season average of \$3.61/ bushel. WPI's season-average price estimate from the chart above is \$3.51/bushel. The bottom line is that producers rarely put on the brakes when input costs are low, and that packers and processors generally benefit from more cattle, hogs and broilers coming through the system.

Packer Margins

Beef packer margins have declined as fed cattle prices have steadily increased since October. On the other hand, the rise in fed cattle prices has certainly helped the margins of cattle feeders who

are keeping current with marketings. Packers are locked into the market in order to supply their forward sales contracts and are thus likely stuck with thinner margins early in the year, especially with seasonally weaker beef prices through the first quarter. Over the longer-term in 2017, however, packers can reduce line speeds and shorten their forward sales to help fatten margins, and more cattle coming through the pipeline will help hold cattle prices in line and allow more efficient slaughter operations.



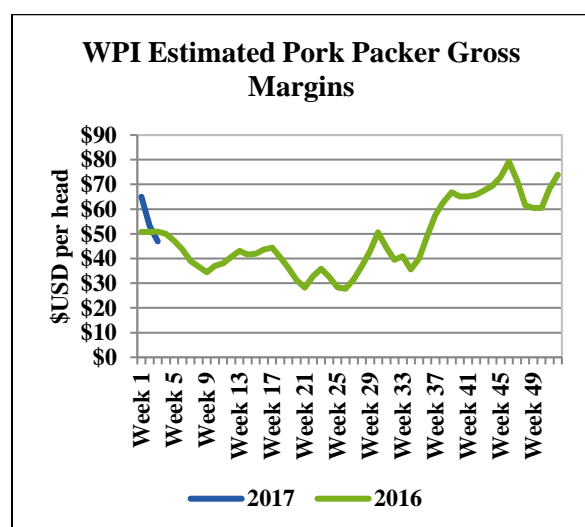
Source: USDA, WPI

Based on record hog slaughter and pork cutout values remaining surprisingly strong, pork packers enjoyed huge margins starting in the fourth quarter of 2016. Strong demand from both domestic and export markets was critical in buoying cutout values. Starting 2017, hog prices rebounded to levels not seen since August 2016, cutting into margins. However, prices should decline based on the expected increase in the swine herd. Demand for pork is anticipated to remain high through the year, which will help maintain cutout values and should provide sufficient margins through the first half of the year.

In the second half of the year, new slaughter capacity is expected to come on line. This expansion is a result of the profitability packers saw in 2016 that drew capital investment into the sector. The estimated weekly slaughter capacity for hogs in the spring of 2016 was 2.44 million

head (operating at an average of 5.4 days a week), according to a National Pork Board survey. Media announcements and industry estimates indicate 140,400 head per week slaughter capacity will be added by the second half of 2017 and then another 54,000 head in 2018. This will be a 6 percent boost over the spring 2016 estimated capacity.

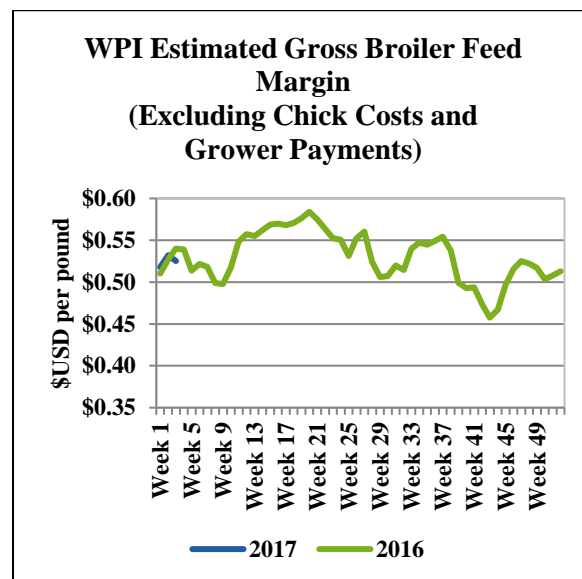
Despite more hogs coming on line in the second half of the year, this higher capacity does have the potential to increase hog prices due to more competition for throughput by packers. In turn, this could eat into margins, although it often takes three-six months before a new plant is fully operational to nameplate capacity. If this is the case, any impact on hog prices would be deferred to 2018.



Source: USDA, WPI

Broiler margins have started out 2017 closest to its year-ago range of the three species. Prices for breast meat are down, but the holiday, college football bowl game and Super Bowl seasons have boosted wing prices to date, thereby supporting margins. The broiler sector is on track for about 2 percent growth in production, and almost all of that will come from a larger flock. Slaughter weights are likely to remain flat through the year as producers try to avoid “woody breast” syndrome, which plagued larger birds through 2016. The condition causes the breast meat to be hard to the touch and often pale in color with poor

quality texture. Food service demand, in particular, has been a driver of trying to avoid woody breast. Additionally, broiler production is moving toward more production of “never ever” antibiotics use, which will also limit the gain of a significant portion of the flock and thus bring down the slaughter weight average.



Source: USDA, WPI

Exports are Crucial

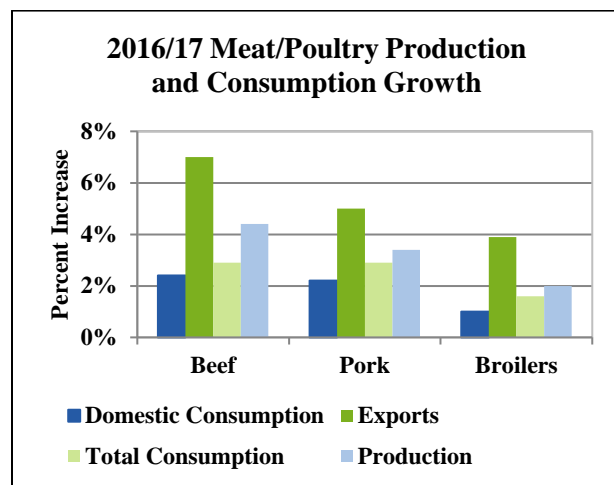
All in all, higher production and larger meat/poultry supplies present an opportunity for producers, and hatchery data, the third quarter pig crop and 2016 calf

Higher production and larger meat/poultry supplies present an opportunity for producers.

crop indicate all meat production will grow in 2017. Moreover, producers are enjoying lower feed costs and otherwise favorable conditions – not factors that would generally result in a production slowdown anytime soon. +Thus, the key is total consumption, especially the level of exports. The latter can prevent or at least limit any buildup of domestic inventories that would push down wholesale and retail prices.

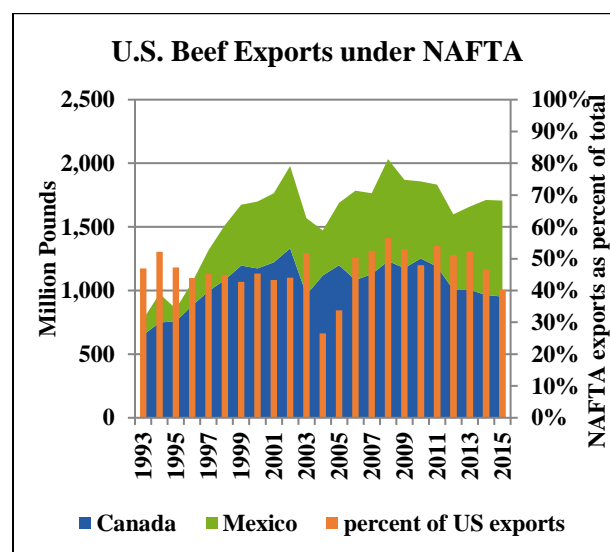
Exports will be particularly crucial to maintaining beef prices, while the fundamentals for pork and

broiler meat are tighter and require less support from them.



Source: USDA, WPI

Indeed, the risk to the red meat packing sector's 2017 outlook is exports, especially the planned renegotiation of NAFTA. Under the original agreement, broilers are still subject to fairly restrictive tariff-rate quotas, but the NAFTA market is critical for red meat. On average, Canada and Mexico have accounted for 50 percent of U.S. beef exports since 2007. Mexico alone consumes 8 percent of all U.S. pork production. The NAFTA renegotiations will be a key factor to watch over the coming year.



Source: USDA, WPI

FARM INPUTS

By Joost Hazelhoff

Top Four Reasons WPI is Bullish the Farm Inputs Industry

- Seasonal spring planting demand in the Northern Hemisphere and contracted urea and DAP supply out of China have firmed the near-term price outlook for fertilizers.
- Historic correlations between crude oil and fertilizer prices suggest current urea prices are intuitive, while DAP levels are high.
- Corn prices would have to move significantly higher to provide upside for nitrogen prices.
- Thermal coal prices in China increased again while U.S. natural gas prices have been stable, giving the advantage in nitrogen production to U.S. manufacturers.

Compared to a rather challenging 2016, there seems to be a cautiously optimistic sentiment in the fertilizer industry for 2017. That is driven by a slowdown in capacity growth, average 2017 prices generally higher than 2016, and stronger demand. Having said that, new supply will likely start affecting prices in Q2 of 2017.

In nitrogen, urea prices took most of December and January to recover from their early December weakness that was driven by the Indian tender cancellation. Significant price support has also come from China's reduced exports. As discussed in the December *Ag Review*, coal-based urea production in China was dealing with ever-increasing cost of its feedstock, thermal coal. This has been propping up Chinese FOB prices while driving a shutdown of the least efficient production. Although urea price increases stabilized/reversed somewhat towards the end of January, additional near-term boosts are possible with seasonal demand in

There seems to be a cautiously optimistic sentiment in the fertilizer industry with stronger demand and generally higher prices.

the U.S. and Europe about to take center stage.

In phosphates, DAP prices have firmed for the past two months with relatively strong demand in the Northern Hemisphere. Additionally, supply has been tight with Chinese suppliers switching output toward the domestic market in anticipation of seasonal spring demand. For the near term, the price outlook for DAP and MAP prices appears firm.

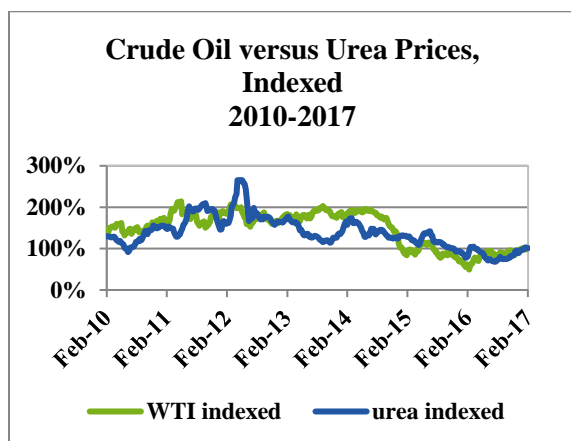
Crude Oil versus Fertilizers

Current urea values continue in the range of the historical price band between crude and urea. Unless crude manages to trade a significant leg higher, DAP values appear to be high from an energy standpoint. WPI is not counting on much upside support from crude in this regard.

Since the beginning of 2017, crude oil has traded in a narrow range of \$5/barrel. At this juncture, it is not anticipated to move significantly higher out of this band. On the upside, there is supply discipline by OPEC

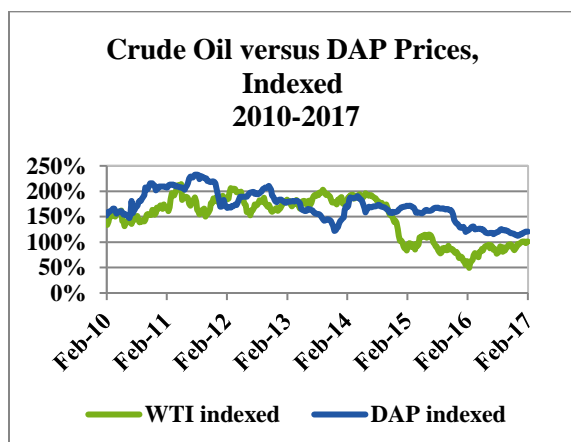
Near-term urea prices face possible further increases as seasonal U.S. and European demand takes center stage.

and Russia. On the downside, there is the prospect of resurgent shale oil production brought back to life by +\$50/barrel crude oil.



Source: UA Dataservice, WPI analysis

Note: 1 May, 2009=100%



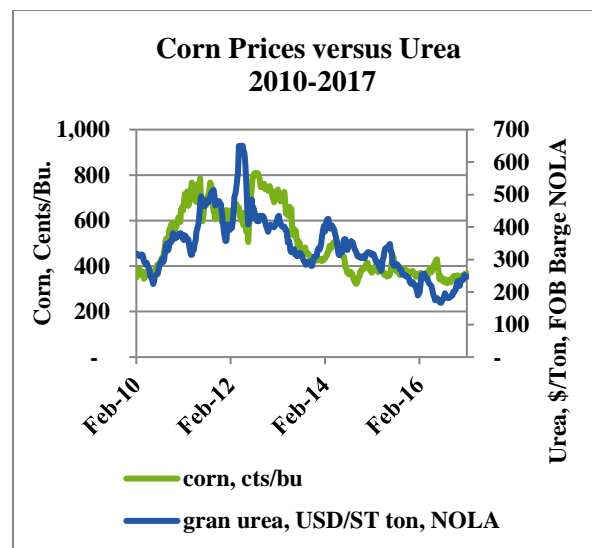
Source: UA Dataservice, WPI analysis

Note: 1 May, 2009=100%

Near Term: Grains versus Fertilizers

On the demand side, a significant part of near-term sentiment, especially for nitrogen, will be driven by the upcoming crop mix in the Northern Hemisphere, most notably in the U.S. The current soybean-corn spread seems to favor soybeans, which is weighing on nitrogen demand expectations. Current urea prices are within the historical urea-corn band. A significant move higher by corn prices would be required to provide grain-based upside for fertilizers. That move higher would need to be inspired by a more bullish take on the new crop. While very

preliminary first takes on the 2017/18 corn crop call for a tighter balance sheet, it remains unclear whether the difference is big enough to justify a notable increase in fertilizer prices.

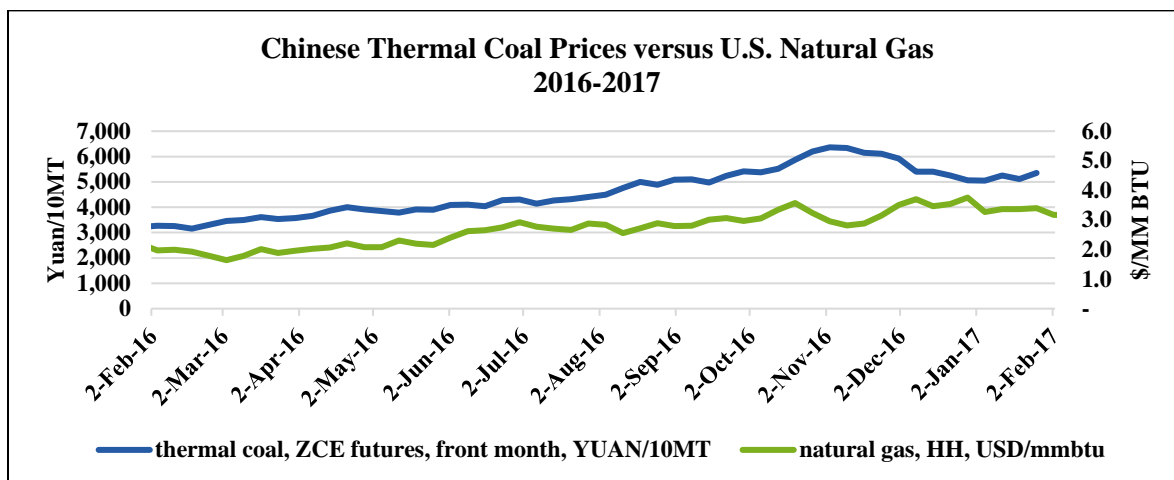


Source: CME, WPI analysis

Nitrogen Cost of Production: Gas-Based versus Coal-Based

In previous editions of *Ag Review*, it was noted that U.S. nitrogen production margins based on the spot cost of natural gas benefitted from lower U.S. gas prices. Conversely, coal-based (Chinese) production has been dealing with ever-increasing prices of thermal coal. In December, the price drop in thermal coal and the price increase for natural gas made us wonder whether this constituted a trend reversal or a mere blip. Natural gas prices have since stabilized again as thermal coal prices simultaneously went up. WPI's view is that for the near term, the margin benefit for U.S. gas-based production versus Chinese coal-based nitrogen has not yet plateaued.

WPI suspects that the margin benefit for U.S. nitrogen production versus Chinese production has not yet plateaued.



Source: CME, CSI data, WPI analysis

U.S. FARM EQUIPMENT INDUSTRY

By David Gregg

Top Four Reasons WPI is Bullish the U.S. Farm Equipment Industry

- Smaller tractor (less than 70HP) sales have been more robust than expected.
- The industry's focus on technology will bring additional on-farm efficiencies and expand demand for improved equipment.
- New Holland's acquisition of Kongsilde Industries creates an even more competitive marketplace.
- Caterpillar's revenues are growing in Asia-Pacific markets, and President Trump has indicated a possible reliance on U.S. equipment companies for infrastructure projects.

The theme of falling from lofty highs still permeates the heavy machinery and farm equipment sectors (see *Ag Review*, October 2016), and key industry players' net income is down as much as 30 percent from the 2013-2015 period. However, some positive movement is noted here in Q1 2017.

Commodity Prices Still a Challenge; Some Bright Spots

Though commodity prices remained relatively low throughout the fall 2016 harvest of North American row crops, record yields and robust export demand warded off the worst of prognosticated scenarios. The result was an overall better mood for the industry than forecast in the summer of 2016. In some cases, this translated to a quickened pace of sales for the farm equipment industry. Overall, the end of 2016 saw good demand for higher horsepower tractors, especially in the fourth quarter as farmers and ranchers looked to invest and eliminate taxable income with combine sales leading the upswing.

This dynamic was especially noticeable in the soybean belt and down into Kentucky where high yields led to more aggressive purchases of equipment at year's end. Used equipment continues to hold value; the highest reported U.S.

auction price was \$286,000 for a 2014 John Deere S680 combine, sold in North Dakota. This supports industry reports that farmers are still looking at slightly used equipment as opposed to new models.

However, conflicting reports from the northern Plains describe farmers still stung by overextension in the heady days of the recent bull market, and many have consequently taken a "wait-and-see" approach to larger equipment purchases. Dealerships still full of new-model-year machinery support this story. Meanwhile, USDA's most recent Cattle on Feed report reveals that the U.S. beef herd expansion is ongoing, a dynamic that will continue to exert downward pressure on prices and slow investments by ranchers into mid- and large-range utility tractors.

Meanwhile, the relatively strong U.S. dollar is still influencing the

pace of farm machinery sales in key global markets. A report from the trade group European Agricultural Machinery published on 30 November 2016 detailed slack demand in 2016 and expectations for the same in 2017 with the

Used equipment is holding values well, indicating possible slow demand for new models.

best-case scenario being “stable” demand for agricultural machinery on the Continent. The overall negative trend was bucked by France and Spain in 2016, but only the latter is expected to show an increase in market activity (5 percent) for 2017. Meanwhile, the machinery market in Germany is forecast to decline 2 percent in 2017, up from the dismal 9 percent decrease in 2016.

Stocks on the Rise

A review of stock performance for key industry players reveals a range of 29- 52 percent growth since February 2016 and more modest single-digit increases since the start of 2017.

Change in Stock Performance of Select Industry Players (Pct.)		
Firm	One Month	One Year
AGCO	6.74%	28.78%
ALSN	3.48%	46.43%
CAT	1.39%	51.69%
CNHI	2.53%	36.87%
DE	2.98%	39.52%

Source: DTN, WPI

Contrary to expectations, the bear market mood has been tempered with continued export demand (described above) and, more recently, weather concerns in South America. Political machinations have also led to some optimism: The Trump administration’s border wall effort led directly to rising stock prices after he mentioned that he would rely on (among others) Caterpillar and John Deere to build it. Both firms saw immediate stock price increases after Trump’s comments.

“I only want to use Caterpillar, if you [want to] know the truth. Or John Deere. Buy a lot of equipment from John Deere. I love John Deere, too.” – President Donald Trump

However, Caterpillar’s recent restructuring – including job cuts in the U.S. – and slow global demand are the main story for that firm right now. Globally, CAT has seen revenues decrease in markets such as the Middle East and Latin

Politics offer reason for optimism as President Trump mentioned a prominent role for CAT and DE in his plans.

America but an increase in Asia-Pacific demand (driven primarily by China).

From the Farm Field to the Garden

While sales for higher-horsepower tractors and combines saw an unexpected upswing in late 2016, a continued bright spot and focus of large equipment manufacturers such as John Deere (NYSE: DE) and AGCO (NYSE: AGCO) is the market for smaller (+/- 70 horsepower) tractors and relevant implements. Dealers report continued strong interest in small-scale lawn and garden equipment for use on hobby farms.

Keep an Eye On:

- ***New Holland’s acquisition*** of the Grass and Soil business of [Kongsilde Industries](#), part of the Danish Group Dansk Landbrugs Grovvarerelskab. The business develops, manufactures and retails tillage, hay and forage implements. The pace of industry consolidation in a competitive marketplace should be watched.
- ***Emphasis on technology*** by key industry players. For example, John Deere:
 - John Deere is marketing the technology features of its 5R utility tractor, including the “optional inclusion of the *CommandArm* console.”
 - The company also recently introduced two HD Wi-Fi video cameras designed to allow farmers a live look at their property and/or machinery, partnering with [Tend](#) to develop the *John Deere Wi-Fi Camera 100* and *John Deere Outdoor Wi-Fi Camera 120W*.
 - John Deere is adding “Foresight Intelligence” to supplement its existing array of “construction data solutions”

aimed at increasing dealer efficiency and reducing customer's repair-induced downtime.

POLICY TRENDS

By Gary Blumenthal

Top Four Reasons WPI is Bullish Policy's Implications for Agribusiness

- Macroeconomic growth is looking stronger.
- Reduced regulatory burden and more business-friendly tax policy are likely.
- Resilience is greater than acknowledged.
- Low expectations for Trump may ultimately lead to a modest upside.

In a half-dozen years, the world went from a food versus fuel fight amidst tight stocks to a bear market that flips the debate from a focus on supply to an urge to find demand. There is only one quick way out of the current situation, and that is a weather shock in a major producing area. Barring that, it will take time to build demand up to the level needed to unburden the surpluses. There are political risks at play, but there are also policy developments under way that will help on the demand side. In fact, the bullish uptick this month is a realization that the political risks are posing more emotional shock than economic harm.

Economic Growth

U.S. financial markets continue to be heady as investors seek to ignore the volatility of a Trump presidency and instead focus on its promises of needed tax reform, regulatory restraint and infrastructure spending. Meanwhile, Europe faces similar uncertainties with pivotal elections in 2017 and at least the potential of consequential changes at the top. Still, Chris Giles of the *Financial Times* points out that the eurozone has

had 14 straight quarters of growth, unemployment is now in single digits, and economic sentiment is the highest in six years.

Even Britain, which was to suffer a horrible death due to Brexit, has fared better than forecast, and pound sterling maintains strength. Now equally dire warnings are being made about Frexit, should Marine Le Pen win power in France later this year and commit her nation to departing the eurozone. More immediately, France is on pace to violate the zone's budget deficit limit, and the International Monetary Fund (IMF) refused to provide support to another European Central Bank (ECB) bailout of Greece. Germany has been the source of European stability, but now the once formidable leadership of Angela Merkel has found an election year threat from the SPD's Martin Schulz, who is ahead of her in some polling. As in America, the political drama in Europe exceeds the economic threat.

Critical toward building new demand for agricultural products is the situation in China, and it is encouraging that both the country's exports and imports are rising faster at the start of 2017 than a year earlier. There is also an aggressive effort to work down overbearing stocks of corn and to ease back its production of the commodity in the coming year.

As in America, the political drama in Europe exceeds the economic threat.

Capital, Scale and Technology

Whether it is a bear market, a bull market or most likely a cyclical market, succeeding in agriculture requires a troika of assets: capital, scale and technology. In richer countries, governments supplement the capital requirements of the sector. Ironically, though, they are sometimes focused inordinately in fighting the second requirement of competitiveness: economies of scale. Propping up small farms is a social and consequently political initiative, not an economically rational pursuit. The average size of farms grows every year as farmers individually pursue larger capacity.

Technology provides the greatest potential for future success, but private investment (capital) in this critical component moves with the market. According to AgFunder, a finance brokerage for ag tech startups, spending fell 30 percent in 2016 – a far larger drop than was experienced in the global venture capital or merger and acquisition markets. Investment in biotechnology has increased as larger types of multistacks² get deployed. Additionally, the biopesticide market is growing 15-20 percent per year, but funding of other initiatives has fallen.

Data provider CB Insights had identified over 80 agricultural technology startup firms ranging from software to analytics to new hardware (drones, robotics sensors, smart irrigation, etc.), but the downturn in funding will likely consolidate this fragmented subsector.

Still, the emerging ag tech field is critical for the industry's future. Most farmers are older because operations are often inherited and take years to build into larger enterprises. Meanwhile, management skill has historically been earned through experience and intuition. Farming will

Farming will eventually look like manufacturing, where knowledge and skill sets are built into computer algorithms.

² Crops with multiple or “stacked” edited genes.

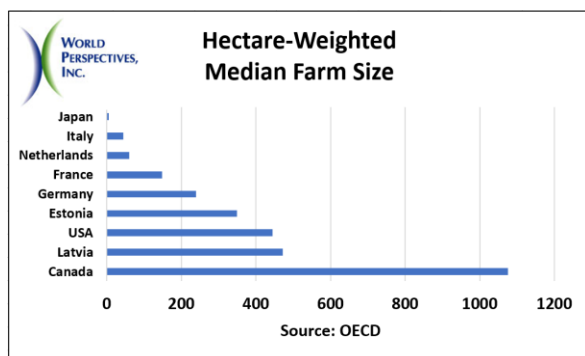
eventually look much more like manufacturing where knowledge and skill set requirements are being built into computer algorithms. Automation will not only address inputs and outputs, it will also enable better management of externalities and thus regulatory compliance.

Moreover, the way that food is produced and what is produced will change. The current merger of chemical and life science companies is driven by important biological developments. Science offers the possibility of profoundly improving the foods that are produced and consumed. The journal *Science* notes how horticultural researcher Harry J. Klee is genetically putting the taste back into tomatoes without losing the size and durability traits that were added via conventional breeding. In contemplating the possibilities, journalist Joe Queenan jokes that “Celery hasn’t excited anyone in 400 years.” In short, there are immense possibilities.

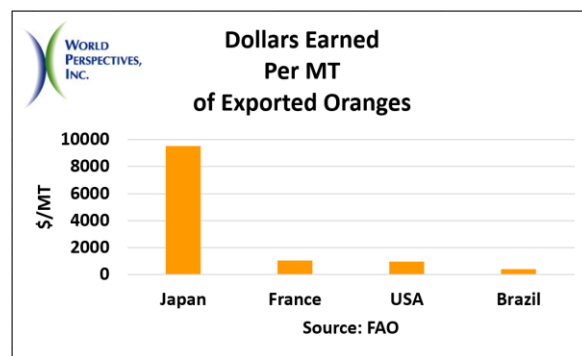
The Japanese Model

Coddled by large border protections, Japan’s farmers have been able to cobble out a living on some of the smallest farms amongst the 35 rich nations belonging to the Organization for Economic Cooperation and Development (OECD). However, increasing trade liberalization has forced the hand of policy makers in Tokyo, and changes are underway. Intermediary structures are allowing the consolidation of farmland, and the government will phase out by 2018 the “gentan” subsidies to rice farmers for withholding production. However, there are two other changes occurring in Japan that should inform even the largest agricultural-producing nations.

First is the focus on technology. There were over 300 companies showcasing 55,000 products to improve the nation’s agricultural productivity at last year’s Agri World Expo in Tokyo. At the government’s urging, many of Japan’s largest corporations long active in consumer electronics and manufacturing have added focus to solving the nation’s agricultural productivity problem.



Second has been a laser-like focus on exporting the highest quality food products or those unique to the country such as sake. Japanese food products are expensive but also perfect for gift giving. Thus, Japan typically earns a premium on the products it sells (see following graph below), and its food exports have increased for four straight years. The Japanese government goal is to boost the value of agricultural exports to 1 trillion yen in 2019, a nearly three-fold increase since 2013.



Beating Commoditization

During this bear market, policy makers will be under intense pressure to focus public capital simply on farm level cash flow. However, the future of agriculture's profitability is more efficient inputs and value-added outputs. This will require a stronger focus on technology.



At the Nexus of Markets and Policy