

AEDE Agricultural Report 2018-001**As Chinese Trade Tensions Build,
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As Chinese Trade Tensions Build, Do Ohio Producers Need to Worry?

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Abstract

The likelihood of a full-blown trade war between the U.S. and China has increased substantially in the past few months, each country either implementing or proposing a range of tariffs against each other's imports. Such tariffs would result in higher machinery costs, lower corn, soybean and pork prices for U.S. agricultural producers, and a decrease in the net worth of Ohio farm families. This article reviews the value of Ohio agricultural trade and the usage of U.S. corn and soybeans. In 2017, Ohio exported \$754 million to China in agricultural products, down from the previous year due to lower production and commodity prices. Using a representative 1,100-acre west central Ohio farm, evaluation of a 25% tariff on U.S. corn and soybeans shows that financial health deteriorates over the projection period (2018-2024) due to lower net returns per acre. Lower commodity prices placing downward pressure on land values negatively influence net worth on top of lower cash flow. Through the representative farm, it is estimated that the proposed tariffs could decrease the farm's net worth by 6% and annual net income by 59%.

Background

A trade war between the U.S. and China has been building for months as both sides engage in a tit-for-tat game of tariff-setting which has the potential of affecting billions of dollars of trade covering goods important to Ohio's economy: automobile parts, aircraft parts, and agricultural products. The relationship between the world's largest two economies (US \$18 trillion and China \$11 trillion, as reported by the World Bank in 2017) is anything but smooth and the repercussions from a conflict over trade will likely affect economies around the world.

The latest disagreement between the two countries has come as the administration seeks to reduce the U.S. trade deficit with China. In 2017, the U.S. Census Bureau reported U.S. exports to China at \$130.4 billion and imports from China of \$505.6 billion, resulting in a trade deficit of \$375.2

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billion. In January 2017, the administration imposed tariffs on washing machines and solar cells after a year of implied action by the U.S. to reduce imports of low-priced products from China and South Korea. In response, China launched an investigation into U.S. dumping of grain sorghum into the Chinese market. The U.S. produced roughly 364 million bushels of sorghum in 2017, 67% being exported. Approximately, 177 million bushels of U.S. grain sorghum went to China, representing 49% of total production. Ohio is not a major producer of grain sorghum falling outside the top 15 producing states.

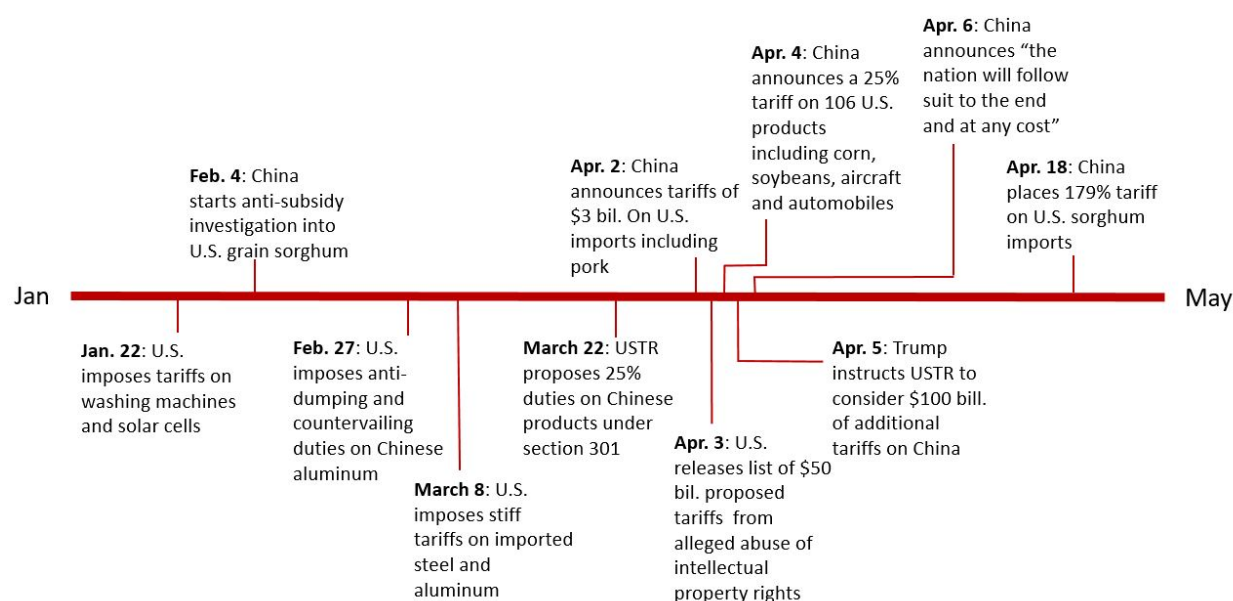


Figure 1: US/China Trade Dispute Timeline

On March 8 of this year, President Trump announced tariffs of 25% on imported steel and 10% on imported aluminum from all countries, several countries subsequently receiving an exemption, most notably Canada and Mexico. China is the world's largest producer of steel, contributing roughly half of global steel production. The U.S. is the world's largest importer of steel at 34.6 million metric tons in 2017. However, only 2% of U.S. steel imports came from China in 2017 as reported by the International Trade Administration. Soon after, China responded with tariffs covering \$3 billion worth of imports including fresh fruits, wine and pork. In 2017, the U.S. exported 22% of total domestic pork production, of which 11% went to China.

At the beginning of April 2018, the U.S. announced *proposed* tariffs of goods covering \$50 billion of imports from China in response to the alleged theft of U.S. intellectual property rights. The next day China released a list of products that would be subject to a 25% tariff the day the proposed U.S. tariffs went into place. The list included soybeans and corn, among other U.S. agricultural products. President Trump then instructed the United States Trade Representative (USTR) to look into additional tariffs covering \$100 billion worth of imports from China. The most recent volley (as of the printing of this report) came on April 18, when China placed tariffs on U.S. sorghum imports. A full timeline of this building trade dispute is illustrated in Figure 1.

Trade for Ohio

In 2017, Ohio exported about \$50 billion worth of goods worldwide, making it the 10th largest exporting state at 3.2% of the U.S. total. The leading export from Ohio was industrial machinery at \$8.9 billion, with soybeans sixth at \$1.8 billion. Soybeans were the only agricultural product in the top 20 exported products for Ohio. Total Ohio agricultural trade accounted for \$3.9 billion in 2017, representing 7.8% of Ohio exports, down slightly from the 2016 percentage of 8.3.

Figure 2 illustrates the share of Ohio exports going to the top six destination countries. In 2017, Canada was the largest importer of Ohio products followed by Mexico, the European Union (EU), and China. Of note is the North American Free Trade Agreement (NAFTA) with Canada and Mexico. The close proximity between the countries encourages the flow of goods across borders. Since 2014, Canada has accounted for 39% of Ohio's exports annually with a value of \$20 billion, while Mexico has accounted for 13% of Ohio's exports valued at \$6.5 billion over the same time-period, NAFTA partners taking 52% of Ohio's exports in total.

When looking just at agricultural exports from Ohio, Canada remains the largest importer of goods at \$1.47 billion in 2017. However, since 2010, China has emerged as the second largest buyer of Ohio's agricultural products, eclipsing Canada in 2014 – see Figure 3. The large decrease in the value of exports to China in 2015 can partially be explained by a small Ohio soybean crop and a 24% decrease in the soybean price. The Ohio soybean crop was also smaller in 2017, at 252 million bushels, resulting in fewer exports to China. Mexico and Canada together represent 49% of Ohio's agricultural trade, emphasizing the importance of NAFTA to Ohio's agriculture producers.

Share of Total Ohio Exports (2017) by Top Six Destination Countries

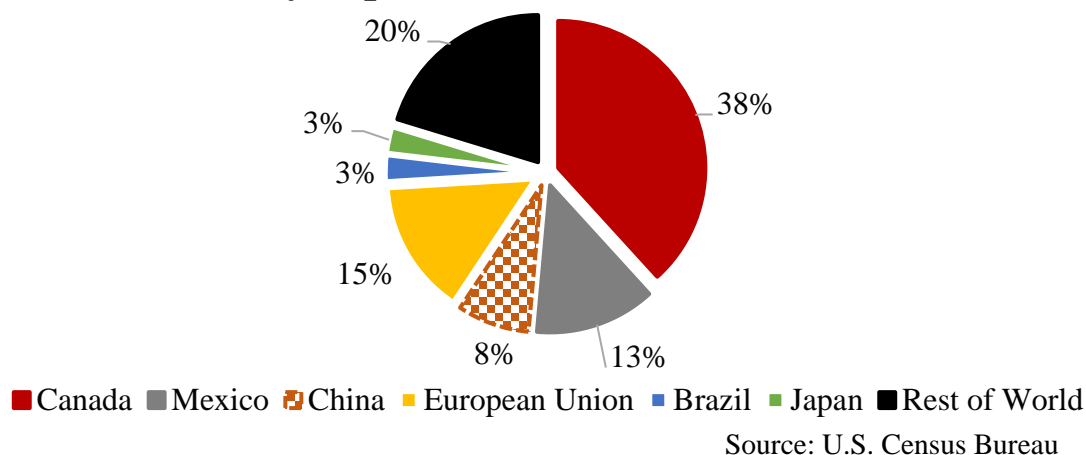


Figure 2: Total Ohio Exports

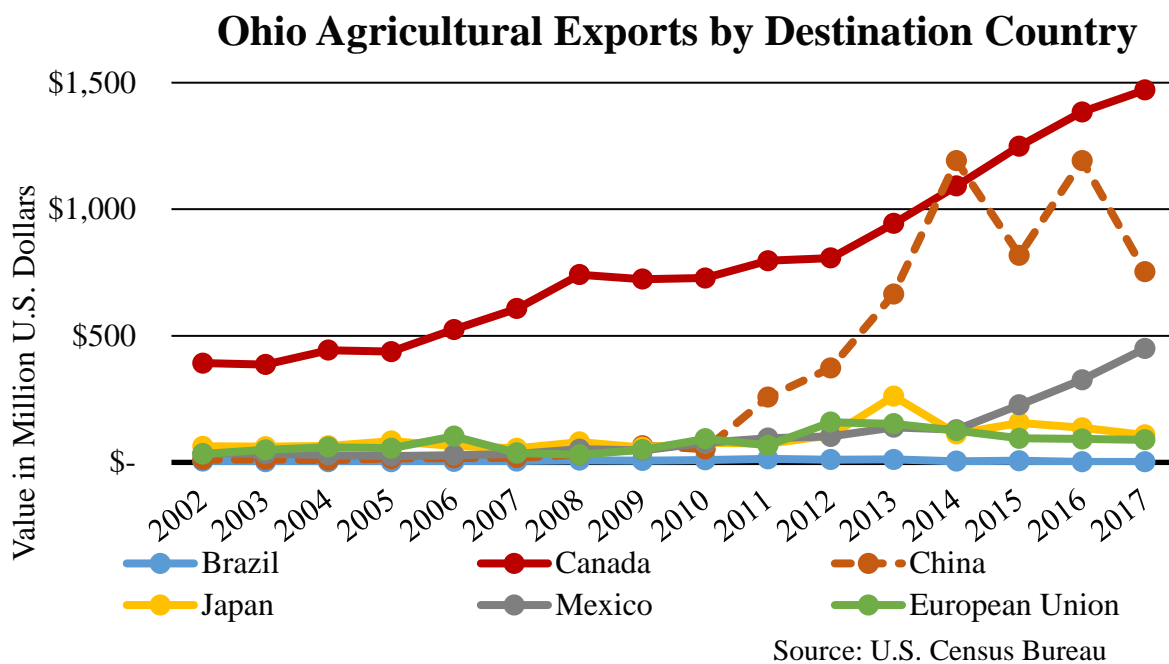


Figure 3: Ohio Agricultural Exports by Destination

The U.S. is not the only exporter of agricultural products to China. In terms of oilseed products, Brazil and Argentina are major soybean suppliers to China. In 2017, the U.S. exported 36.8 million metric tons of soybeans to China representing 30% of total U.S. production. In contrast, Brazil exported 45.3 million metric tons to China, and Argentina exported 7.1 million metric tons, representing 40% and 12% of their production respectively. Since 2012, the U.S. has been the second largest supplier of soybeans to China behind Brazil. The growth in U.S. soybean exports to China has grown 209% over the past decade, but Brazil's growth has been 567% over the same period. The presence of a 25% tariff on U.S. soybeans will likely strengthen Brazil's market share of Chinese imports.

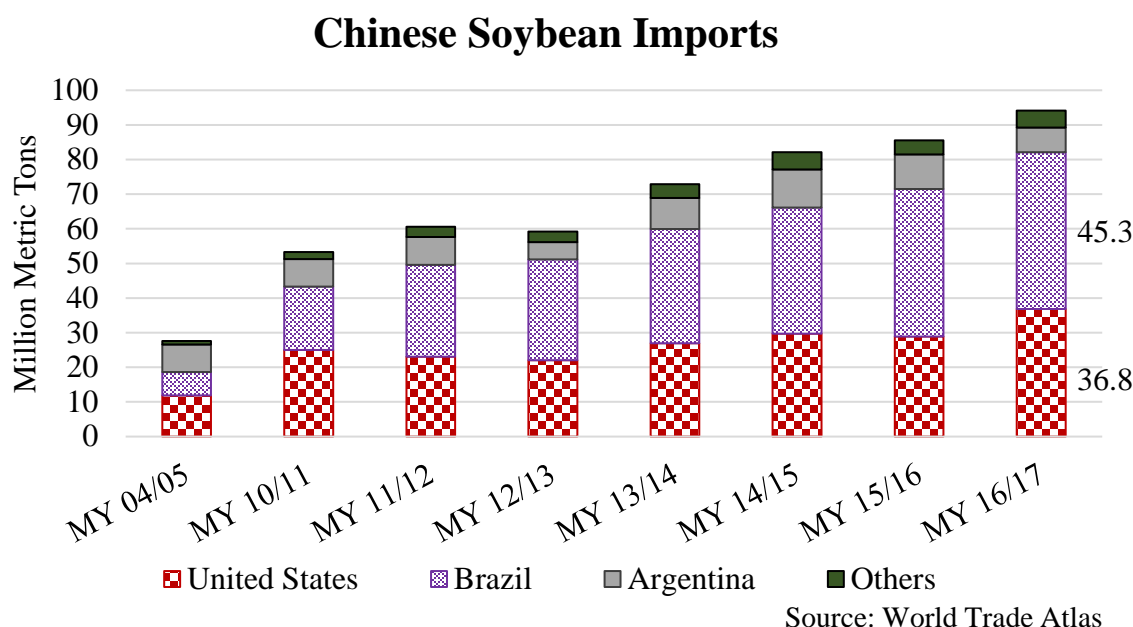


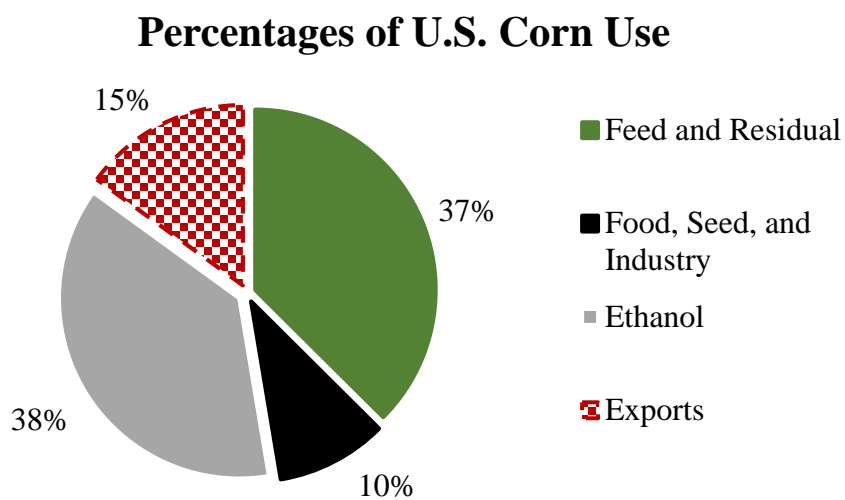
Figure 4: Chinese Soybean Imports

Figure 4 illustrates the share of Chinese imports of soybeans for the largest exporting countries. Worldwide the U.S. is the largest producer of soybeans, accounting for 34% with Brazil accounting for 33%. A 25% tariff on Chinese imports of U.S. soybeans will likely decrease production in the U.S. and increase production in Brazil, enough to promote the largest South American producer to the spot of largest producer in the world. For corn, only 2% of the U.S. corn crop enters the Chinese market, but shifts in planted acreage from soybeans to corn will suppress corn prices domestically.

as well. In 2012, the U.S. exported \$1.32 billion worth of corn to China. With decreasing price and exports, the value of 2016 corn exports to China was \$152 million.

Commodity Break Down Including Percent Exported to China

The U.S. is a net exporter of agricultural commodities with exports of \$138 billion and imports of \$121 billion in calendar year 2017. However, commodities differ in the amount of domestic consumption and trade that make up their markets. As an example, the U.S. exports 15% of raw commodities to international markets – what trade economists term excess supply. However, corn also exists in the form of a feed source for livestock production and as an input for ethanol production, all of which are exported as value added products. For corn, it is more popular for the product to enter export markets in the form of value added rather than as the raw commodity in comparison to soybeans. Using per bushel conversion factors of 2.8 gallons of ethanol, 6.7 pounds of beef, 15.6 pounds of pork, and 46.6 pounds of chicken, results in 1.4 billion bushels of corn being embodied and exported as value added products. The 1.4 billion bushels of value added corn exports represents roughly 9% of domestic production.



Source: World Outlook Board

Figure 5: U.S. Corn Use

By comparison, soybean meal as a percentage of feed rations, and assuming a conversion factor of 47.5 pounds of soybean meal per bushel of soybeans, along with 1.5 gallon of biodiesel per bushel, generates roughly 64.6 million bushels of soybeans exported in the form of value added. The 64.6 million bushels of soybeans embodied in value added exports represents 2% of total soybean production. Figures 5 and 6 illustrate the disappearance of domestic corn and soybeans as a percentage of raw commodity production.

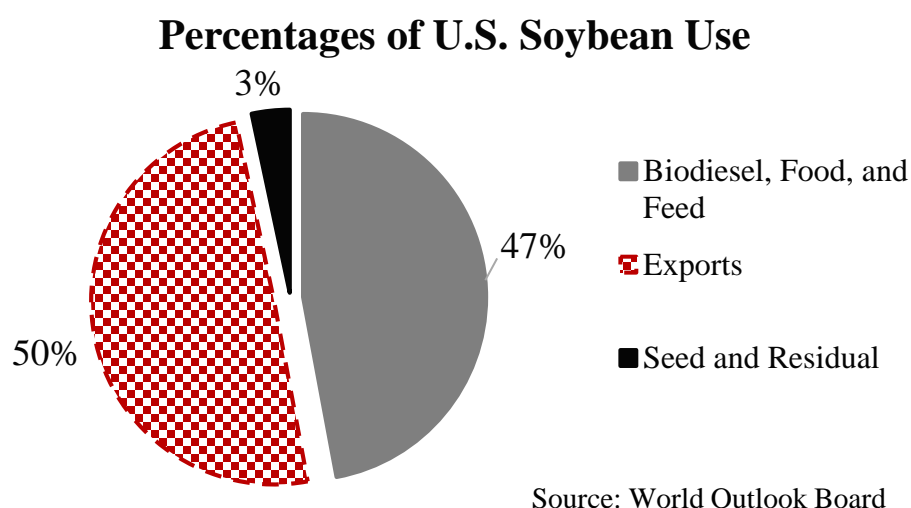


Figure 6: U.S. Soybean Use

In 2017, the U.S. produced 4.2 billion bushels of soybeans of which 2.2 billion left the country as whole soybeans. China is the biggest recipient of U.S. soybeans at around 62% of total exports. Nearly one third of the total U.S. soybean crop leaves for China in the form of whole soybeans. A recent report from Purdue University projects that a 25% tariff could reduce China's imports of U.S. soybeans on average by 69%. A decrease this dramatic in soybean exports to China would calculate out to one fifth of the U.S. soybean crop being exported to China instead of one third. For Ohio, this would account for a decrease of roughly \$241 million in the value of soybean exports. The reduction in soybean exports would initially depress world prices on average by 4.4% and shift soybean acreage to other commodities, including corn. Corn prices would face downward pressure with higher acreage and production, assuming no change in demand.

In the last decade, Chinese demand for pork has increased along with U.S. exports of the product. Pork production has increased 16% in China during this time to meet consumer demand; however, China has not been able to grow the required feed source. Increases in Chinese pork production have increased demand for soybeans and soybean meal. A reduction in U.S. imports will increase feed costs for Chinese pork producers.

In Figure 3, the value of Ohio's agricultural exports to the six largest destination countries was shown, including China as Ohio's second largest trading partner. Figure 7 illustrates the value of Ohio agricultural exports to China for corn, pork and soybeans. In 2017, Ohio soybean exports to China totaled \$691 million down from the high of \$1.14 billion in 2016. Strong domestic use of corn for feed and ethanol has limited the amount available for exports. In 2017, Ohio produced a soybean crop worth \$2.4 billion dollars. At \$691 million, exports to China would account for 29% of the value of the Ohio soybean crop, which is slightly less than the national average.

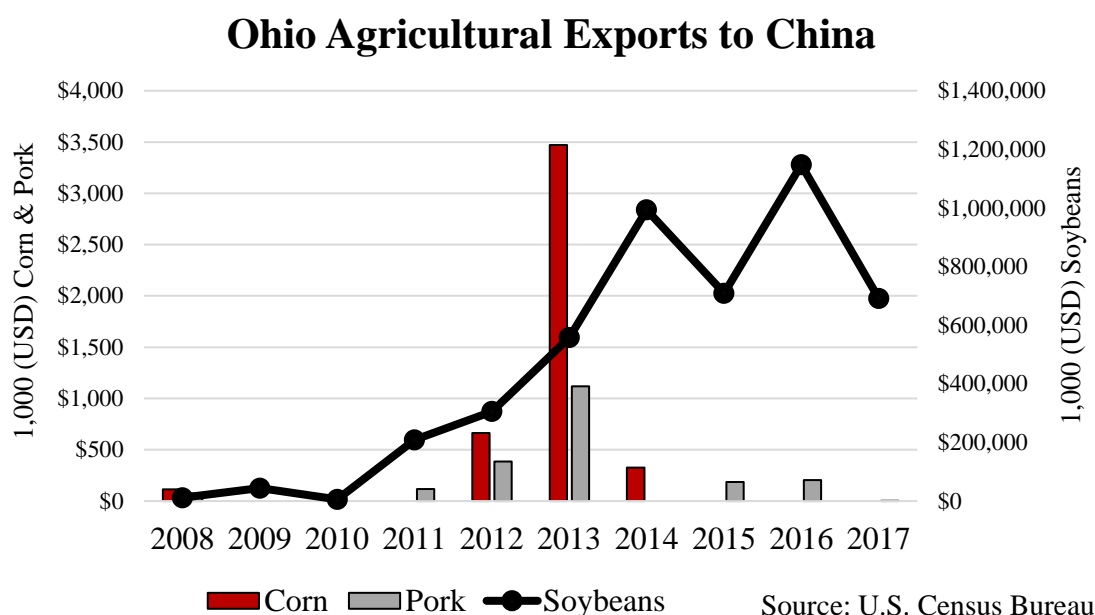


Figure 5: Value of Ohio Agricultural Trade to China

Farm Level Analysis

The possibility of a 25% tariff on imports of key U.S. agricultural commodities has generated a good deal of concern among commodity organizations and commerce directors for states that have

significant trade with China, but the tariffs will also have implications for Ohio producers' income statement and net worth. The effects of tariffs to a representative Ohio corn and soybean farm analyzed here shed light on what producers can expect from a Chinese tariff on U.S. soybeans, corn and pork in the short term.

The fictional representative farm used in this analysis reflects a west central Ohio grain farm. Components of the farm come from the *2015 Ohio Farm Business Summary- Crop Enterprise Analysis*, which includes averages from Ohio farms participating in the Ohio Farm Business Analysis Program. The farm is a 1,100-acre row crop farm with a 50/50 corn and soybean rotation with 30% of the land owned and a debt of 40% on all capital. Ohio State University Extension enterprise budgets provided cost of production estimates. Historical trend yields of 154 bu./acre and 49 bu./acre for corn and soybeans respectively are used. Cash rent in the county is estimated at \$183 per acre. Expected commodity prices for marketing years 2018-2020 represent those published from the Food and Agricultural Policy Research Institute (FAPRI) Annual Baseline Book at the University of Missouri and the Global Trade Analysis Project (GTAP) at Purdue University. In the baseline scenario, prices are projected under current federal policy and existing trade agreements.

In a recent paper released by Purdue University, price declines for U.S. soybeans in response to a Chinese tariff will average approximately 4.4%. Due to uncertainty about the extent to which China will substitute between U.S. and Brazilian soybeans in response to a tariff on U.S. soybean imports, the authors of this report ran two scenarios. First, with a low elasticity of substitution, a 48% decrease in China's imports from the U.S. is matched by an 18% increase in imports from Brazil. Second, with a high elasticity of substitution, a 91% decrease in China's imports from the U.S. is matched by a 36% increase in imports from Brazil. These import adjustments generate soybean price decreases of 3.8% and 4.9% respectively. For Chinese corn imports from the U.S., the range in the elasticity of substitution generated price decreases of 1.1% and 1.6% respectively. At the end of 2017, the farm had a net worth of \$3,538,474 and a 36.8% debt to asset ratio.

The scenario used in this report is one of low prices with constant input costs. Lower cash returns per acre will encourage producers to lower their variable input costs. However, with lower cash

returns per acre in western Ohio compared to 2012-2014 when input costs also increased, there has not been the decline in costs experienced by other Midwest Corn Belt states. In 2017, the National Agricultural Statistics Service reported a state average cash rent of \$152/acre, which was slightly higher than the \$150/acre in 2016. This matches with similar reports by the Federal Reserve Bank showing a range of a 3.8% increase to a 1.6% decrease between 2017 and 2016 for cash rents in Ohio. In a recent report from the University of Illinois, researchers showed the impact of Chinese tariffs on a central Illinois grain farm, but include a low cost scenario with a decrease in cash rents. Ohio has not seen the decreases in cash rent likely due to population density and competition from developers.

The U.S. tariff on Chinese steel set at 25% is expected to increase fixed costs for U.S. agricultural producers through higher prices for machinery. The representative farm accounts for capital depreciation and replacement costs based on an estimated lifespan, but the impact to cash flow and net worth is smaller than the impact to a farming operation with higher machinery turnover. Prices used in the analysis are included in Table 1. The prices used for the 25% Chinese tariff scenario reflect the GTAP analysis for 2018, which is then allowed to fluctuate for the remainder of the projection period based on FAPRI expected prices.

| | | Marketing Year | | | | | | |
|---|----------|----------------|--------|--------|--------|--------|--------|--------|
| | | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 |
| Baseline | Corn | \$3.65 | \$3.82 | \$3.81 | \$3.80 | \$3.76 | \$3.70 | \$3.68 |
| | Soybeans | \$9.38 | \$9.75 | \$9.81 | \$9.75 | \$9.63 | \$9.51 | \$9.53 |
| Chinese Tariff - Low Elasticity | | | | | | | | |
| | Corn | \$3.61 | \$3.68 | \$3.67 | \$3.66 | \$3.62 | \$3.58 | \$3.56 |
| | Soybean | \$9.03 | \$9.17 | \$9.23 | \$9.17 | \$9.05 | \$8.93 | \$8.95 |
| Chinese Tariff - High Elasticity | | | | | | | | |
| | Corn | \$3.59 | \$3.70 | \$3.69 | \$3.68 | \$3.64 | \$3.60 | \$3.58 |
| | Soybean | \$8.92 | \$9.05 | \$9.11 | \$9.05 | \$8.93 | \$8.81 | \$8.83 |

Table 1: Price baseline and projections (\$/bushel)

| | Estimated Net Income per Year | | | | | | | |
|---|-------------------------------|----------|----------|----------|----------|----------|----------|----------|
| | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | Average |
| Baseline | \$56,810 | \$63,423 | \$68,241 | \$69,236 | \$65,483 | \$59,728 | \$62,115 | \$63,577 |
| Chinese Tariff - Low Elasticity | | | | | | | | |
| | \$42,711 | \$32,751 | \$37,286 | \$37,998 | \$33,998 | \$29,779 | \$31,902 | \$35,199 |
| Chinese Tariff – Average | | | | | | | | |
| | \$39,963 | \$22,841 | \$27,281 | \$27,897 | \$23,766 | \$19,486 | \$21,513 | \$26,107 |
| Chinese Tariff - High elasticity | | | | | | | | |
| | \$37,216 | \$12,931 | \$17,275 | \$17,796 | \$13,569 | \$9,194 | \$11,125 | \$17,015 |

Table 2: Representative Farm Net Income

As shown in Table 2, the reduction in commodity prices results in lower net income per year through 2024. The average net income under the baseline is \$63,577, but falls to \$26,107 under the estimates from a 25% Chinese tariff. Net income in 2018 benefits from expected ARC-CO soybean payments calculated for program year 2017. No payments are expected in program year 2018 based on trend yields and an expected marketing year average price. As a reminder, the marketing year average price used for commodity payments spans from September 1, 2017 to August 31, 2018. Considering that over half of the marketing year has passed, a reduction of prices outlined in Table 1 is estimated to not be significant enough to significantly change ARC-CO payments from the 2017 estimates.

The drop in net income per year due to lower commodity prices reduces the farm's projected net worth in 2024 by 6% and increases the debt to asset ratio to 34.7%, up from 32%. The expectation is that lower commodity prices will put downward pressure on land values, further reducing net worth. Under the scenario, the current ratio, and debt coverage ratio fall to levels that would generate concern for the financial health of the operation. Farms with different ratios and financial structure will respond to the effects of tariffs differently, with larger impacts for farms with higher debt levels and smaller negative impacts from farms with lower debt levels.

These results are based on a crop rotation that remains 50/50 with corn and soybeans. Stronger returns for corn later in the prediction period could encourage producers to alter the current crop rotation with either introduction of other crops such as wheat and barley, or a higher percentage of corn planted.

Summary

Chinese tariffs on U.S. soybeans have not been implemented yet, but concern throughout the U.S. agricultural industry and Ohio exists because of uncertainty in export markets and commodity prices. Ohio exports \$50 billion of products worldwide and \$3.9 billion of agricultural commodities. The three largest markets for Ohio agricultural exports are Canada, China and Mexico with especially strong growth in the Chinese market since 2010. The U.S. is the second largest supplier, behind Brazil, of soybeans to China at 39%, and a tariff on U.S. soybeans would likely strengthen Brazil's position in the market. Roughly, 31% of U.S. soybeans are exported to China, which would fall to 22%, a loss to Ohio of an estimated \$241 million. Ohio exports to China of raw commodities are strongest for soybeans with large corn processing and domestic use limiting raw corn exports. Through calculations made based on a representative west central Ohio farm, and assuming an average degree of Chinese substitution between U.S. and Brazilian soybean import, it is estimated that average net income per year (2018-2024) would drop from \$63,577 to \$26,107 under the proposed tariff, which translates to a 59% decrease in net farm income. Weakening financial health through debt coverage and lower land values will continue to erode the financial health of Ohio farm families. The net worth of the representative farm decreased 6% from the baseline in projection year 2024 under the proposed tariffs. These data should not be seen as a concrete prediction, as an analysis of external factors such as weather and shifts in demand could alter the outcomes.

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