Minnesota and Dakota Land Values, and Tariff Impacts on US Agriculture

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A Quick Introduction: Dr. Wendong Zhang

– Grown up in a rural county in NE China
– Attended college in Shanghai and Hong Kong
– Ph.D. in Ag Econ in 2015 from Ohio State
– 2012 summer intern at USDA-ERS on farm economy and farmland values
– Research and extension interests:
  land value/ownership  [www.card.iastate.edu/farmland/](http://www.card.iastate.edu/farmland/)
  agriculture and the environment
China Ag center  [www.card.iastate.edu/china](http://www.card.iastate.edu/china)
My hometown: Shenxian, Shandong Province

Greenhouse – plastic film - Shandong Province
Mainland China vs. US
Ag is comparative advantage for US

Figure 1. Number of farmers in Chinese provinces compared to Iowa

Figure 2. Crop land per farmer in China in acres

Navigating the Chinese agricultural economy through the lens of Iowa
By Wendong Zhang, extension economist, 515-294-2536, wdzhang@iastate.edu; Minghao Li, postdoctoral researcher, Center for Agricultural and Rural Development, Iowa State University

Average Farm Size
China: 2 Acres
US: > 400 Acres
China Corn Yield

2015 Soybean Yield

US: 48 Bu/acre
Iowa: 56 Bu/acre
China: 26 Bu/acre

China Soybean Yield

Corn Yield (Iowa=100%)
- No data
- 11% - 40%
- 41% - 45%
- 46% - 50%
- 51% - 60%

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Why Care About China?

Reason 1: China is a huge market for US

Source: Choices
2017 Q2 Issue
US holds a large and consistent ag trade surplus with China

US Ag Trade with China 1998-2018
(Jan to April 2018 only)
Percentage of U.S. Agricultural Production Exported

- **Walnuts**: 79%
- **Cotton**: 76%
- **Almonds**: 67%
- **Pistachios**: 62%
- **Sorghum**: 59%
- **Rice**: 55%
- **Soybeans**: 62%
- **Wheat**: 5%
- **Grapes**: 36%
- **Pork**: 15-20%
- **Corn**: 2%
- **Cherries**: 19%
- **Apples**: 18%
- **Poultry**: 16%
- **Dairy**: 15%
- **Beef**: 10%

> **20%**

Overall U.S. farmers export more than 20% of what they produce.

*Including ethanol, DDGS, and HFCS exports
Source: USDA-Foreign Agricultural Service, Production, Supply and Distribution System
Reference years: Marketing Year 2015/16 - 2017/18
Chinese People Are Getting Richer, and will need more protein

China’s GDP will overtake the U.S. level in 2028 at these projected average growth rates:

Per-capita Meat Consumption by Country 2016 - OECD

- United States
- Sub-Saharan Africa
- India
- OECD Countries
- Mexico
- Japan
- European Union
- China
- Brazil

U.S. GDP per capita was 3.7 times that of China

Bloomberg
What Have We Learned from China’s Past Trade Retaliation Strategies?
Minghao Li, Wendong Zhang, and Chad Hart

JEL Classifications: Q17, F10
Keywords: Agricultural Commodities, China, Tariff, Trade Retaliation

Proportional, Restrained Response
Currently, China has a huge overall trade surplus with the United States, and thus naturally wants to maintain the status quo and avoid dispute escalations. As the two cases above demonstrate, China tends to target agricultural commodities with trade flows comparable to U.S. targets in order to send a clear message. At the same time, China

Target Products That Are Substitutable
In these two cases, China chose commodities that are easily substitutable across products, across sources, or via domestic production. Half of the U.S. broiler products were chicken feet, a replaceable snack food, and sorghum is commonly used for feed and can be replaced by corn or other coarse grains. In terms of substitutability across

Inflict Economic and Political Costs
From the perspective of China’s government, the ultimate goal of retaliatory tariffs is to inflict economic loss on politically influential interest groups in the United States, turning them into lobbyists for easing trade restrictions. For retaliation measures to be effective, China’s market as an export destination for targeted commodities has to be important for U.S. producers, as is the case for broiler products and sorghum. Furthermore, the Chinese government has long recognized the political significance of the U.S. agricultural industry, which partly explains why it targets U.S. agricultural exports in trade spats.
## Why Care About China?

**Reason 4: China will retaliate, diversify and find other suppliers if possible**

<table>
<thead>
<tr>
<th>Commodity (2016 value of China ag imports)</th>
<th>USA</th>
<th>Brazil</th>
<th>Europe</th>
<th>Australia</th>
<th>Argentina or Uruguay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soybean ($34.4 Bil.) (China increased production by 9% in 2018)</td>
<td>38%</td>
<td>47%</td>
<td></td>
<td></td>
<td>A-10%</td>
</tr>
<tr>
<td>Pork ($2.32 Bil.)</td>
<td>13%</td>
<td>50%</td>
<td></td>
<td>Canada: 11%</td>
<td></td>
</tr>
<tr>
<td>Ethanol ($0.38 Bil.)</td>
<td>70%</td>
<td>11%</td>
<td></td>
<td>Pakistan 15%</td>
<td></td>
</tr>
<tr>
<td>Beef ($2.42 Bil.)</td>
<td>0%</td>
<td>22%</td>
<td>28%</td>
<td></td>
<td>U-21%</td>
</tr>
<tr>
<td>Poultry ($1.11 Bil.)</td>
<td>79%</td>
<td></td>
<td></td>
<td>A-9%</td>
<td></td>
</tr>
<tr>
<td>Corn ($0.87 Bil.)</td>
<td>10%</td>
<td></td>
<td>Ukraine: 79%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### China’s Ag Import Sources

- China can produces 97% of its pork, but only 15% of its soybean demand domestically.
- China provided about US$200/acre subsidy to increase soy production (up 9% 2018).
US Loses Market Share as China Increases Meat Imports from the World

Source: Choices
2017 Q2 Issue
China aims to build a global infrastructure network
“Belt and Road” infrastructure projects, planned and completed (March 2017)

Belt and Road Initiative
## Trade Dispute Impacts – Price Changes

<table>
<thead>
<tr>
<th>Cash Crop Prices</th>
<th>05/31/2018</th>
<th>08/15/2018</th>
<th>% Change</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>$3.52</td>
<td>$3.21</td>
<td>-8.8%</td>
<td>USDA-AMS</td>
</tr>
<tr>
<td>Soy</td>
<td>$9.48</td>
<td>$7.83</td>
<td>-17.4%</td>
<td>USDA-AMS</td>
</tr>
<tr>
<td>Ethanol</td>
<td>$1.41</td>
<td>$1.35</td>
<td>-4.3%</td>
<td>USDA-AMS</td>
</tr>
</tbody>
</table>

## Trade Dispute Impacts – Iowa Revenue Loss

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Price damage w elasticity</th>
<th>Per-unit price drop due to China trade dispute</th>
<th>Iowa production</th>
<th>Revenue loss due to China trade dispute (mil. Dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>-4%</td>
<td>-$0.13</td>
<td>2.60 bil. bu</td>
<td>-$325 mil.</td>
</tr>
<tr>
<td>Soy</td>
<td>-10%</td>
<td>-$0.95</td>
<td>0.58 bil. bu</td>
<td>-$551 mil.</td>
</tr>
<tr>
<td>Ethanol</td>
<td>-2%</td>
<td>-$0.03</td>
<td>4.20 bil. gal.</td>
<td>-$105 mil.</td>
</tr>
<tr>
<td>Hog</td>
<td>-11%</td>
<td>-$8.72/cwt or -$18/head</td>
<td>43 mil.</td>
<td>-$795 mil.</td>
</tr>
</tbody>
</table>

Source: Chad Hart, Lee Schulz
U.S. government to pay $4.7 billion in tariff-related aid to farmers

REUTERS Mon, 27 Aug 2018

- The US Department of Agriculture announced the first set of aid to US farmers hurt by President Donald Trump's trade war, totaling $4.7 billion.

- $3.6 billion of the aid will go to soybean farmers who have been hit particularly hard due to China's tariff on the crop.

- The aid is part of a promised $12 billion package to help offset the pain of the trade war.

The market aid payments will be administered by the USDA’s Farm Service Agency and are limited to farmers having an average adjusted gross income of less than $900,000 for the tax years 2014 through 2016. Payments also will be capped per person or legal enterprise at a combined $125,000.

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Initial Payment Rate</th>
<th>Est. Initial Payment** (in $1,000s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton</td>
<td>$0.06 / lb.</td>
<td>$276,900</td>
</tr>
<tr>
<td>Corn</td>
<td>$0.01 / bu.</td>
<td>$96,000</td>
</tr>
<tr>
<td>Dairy (milk)</td>
<td>$0.12 / cwt.</td>
<td>$127,400</td>
</tr>
<tr>
<td>Pork (hogs)</td>
<td>$8.00 / head</td>
<td>$290,300</td>
</tr>
<tr>
<td>Soybeans</td>
<td>$1.65 / bu.</td>
<td>$3,629,700</td>
</tr>
<tr>
<td>Sorghum</td>
<td>$0.86 / bu.</td>
<td>$156,800</td>
</tr>
<tr>
<td>Wheat</td>
<td>$0.14 / bu.</td>
<td>$119,200</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>$4,696,300</td>
</tr>
</tbody>
</table>

**Initial payment rate on 50% of production
Why Care About Farmland Market?

Note: F = forecast. The GDP chain-type price index is used to convert the nominal (current-dollar) statistics to real (inflation adjusted) amounts (2018=100). Source: USDA, Economic Research Service, Farm Income and Wealth Statistics. Data as of February 7, 2018.
Guiding Framework

Land Value = localized net income / universal interest rate
The U.S. Department of Agriculture's Economic Research Service (ERS) indicated on Wednesday that, "Net farm income, a broad measure of profits, is forecast to decrease $4.3 billion (6.7 percent) to $59.5 billion in 2018, which would be the lowest level in nominal terms since 2006."
Positive 2: Historically low interest rates
The Fed’s New Dot Plot

Long-term interest rate expectations
What the Fed Reserve thinks the interest rate should be
Left: Cash Rent Per Acre 1994-2017
Right: Cap Rate (Rent/Value) vs. CMT 10 Rate

Graph 1. Gross Rent-to-Value Ratio 1991-2018

Source: USDA NASS, Federal Reserve
Annual Mortgage Payments vs. Cash Rents for Iowa Farmland Loan

Cash Rent or Mortgage Payments ($/acre)

Source: Zhang and Tidgren 2017
Land Values and Increasing Interest Rates – Purdue U

• Regression Analysis
  – \( LV = f(LLV, CR, r) \)
    • \( LV \) = land value
    • \( LLV \) = lagged land value
    • \( CR \) = predicted cash rent
    • \( r \) = capitalization rate

  – Using data from 1960 to 2017 for west central Indiana, a 1% increase in \( r \), holding cash rent constant, would result in a decrease in land values of 5 to 7%.
Positive 3: Prudence in Ag Lenders/Regulators

• Banking Regulations
  – More stringent, frequent stress-test
  – BASEL III, liquidity requirements for banks
  – (Ron Hansen – Iowa Division of Banking Superintendent) walk into this “with eyes wide open”

• Cash-Flow Based Loan Practice
  – Before 1987: loan to value ratio is 85%
  – 1987-2008: loan to value ratio is 65%
  – After 2008: use cash-flow method for collateral ($4 corn, $10 bean) and 50% of cash flow value

Source: Zhang and Tidgren 2017
Estimated average per-acre values of cropland in North Dakota from 2012 to 2018.
South Dakota Cropland and Pasture Prices

Crop = all non-irrigated cropland including alfalfa
Pasture = all grass land

Figure 2. Average value of South Dakota cropland and pasture/rangeland, by region, February 2017, dollars per acre.
Source: 2017 South Dakota Farm Real Estate Market Survey, SDSU Extension.
South Dakota Cropland and Pasture Cash Rents

**Feb 2018**

Image showing a map of South Dakota divided into regions with cash rental rates for cropland and pasture. The rates are as follows:

- **Northwest**
  - Crop: $***
  - Pasture: $***

- **North Central**
  - Crop: $126
  - Pasture: $50

- **North East**
  - Crop: $166
  - Pasture: $69

- **Central**
  - Crop: $118
  - Pasture: $50

- **South Central**
  - Crop: $89
  - Pasture: $37

- **Southeast**
  - Crop: $204
  - Pasture: $66

Crop = all non-irrigated cropland including alfalfa
Pasture = all grass land

*** Insufficient number of reports to make regional estimates

Figure 1. Average cash rental rate of South Dakota non-irrigated cropland and pasture/rangeland, by region, February 2017, dollars per acre.

*Source: 2018 South Dakota Farm Real Estate Market Survey, SDSU Extension.*
Estimates of average Minnesota farm real estate values
1990 - present

price per acre

- UM study mean
- UM study median
- USDA
- Assessor
Minnesota farm real estate sales:
median price (line) and number of sales (bars)
sales year (Oct. - Sept.)

price per acre

number of sales


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Farmland Price Expectations, 5 years from now

% of respondents

<table>
<thead>
<tr>
<th>Month &amp; Year</th>
<th>Higher Farmland Prices</th>
<th>Lower Farmland Prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/17</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>8/17</td>
<td>45</td>
<td>10</td>
</tr>
<tr>
<td>11/17</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>1/18</td>
<td>45</td>
<td>10</td>
</tr>
<tr>
<td>2/18</td>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td>4/18</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>5/18</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>7/18</td>
<td>40</td>
<td>10</td>
</tr>
</tbody>
</table>

Source: Purdue Center for Commercial Agriculture, Producer Survey, July 2018
By how much do you expect your farm's net income to decline because of trade conflicts?

- Up to 10%: 29%
- Between 10% and 20%: 36%
- More than 20%: 35%

Source: Purdue Center for Commercial Agriculture, Producer Survey, July 2018
Thank You!

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