What Does a Trade War with China Look Like?

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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)
China’s Provinces

My Hometown
Mainland China vs. US
My hometown: Shenxian, Shandong Province

Greenhouse – plastic film - Shandong Province
A corny tale

China imports a farm from Iowa

*A slice of the Midwest outside Beijing*

**Presentations**


**Publications**


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)
Share of U.S. Agriculture Exported in 2016

More than 20% of total U.S. agricultural production is exported annually.

- >70% Cotton
- >70% Tree Nuts
- >30% Grapes
- >20% Cherries
- 50% Soybeans
- 50% Wheat
- >50% Rice
- >50% Sorghum
- 15% Corn
- 15% Poultry
- 15% Dairy
- 20% Pork
- 10% Beef

Share of China in U.S. Ag Exports

- 62%
- 16%
- 75%
- 5%
- 0%
- 15-18%
- 2%
- 0%
- 0%
- 1%

Twitter: @USDAForignAg  Website: www.fas.usda.gov
Source: USDA-FAS Global Agricultural Trade System (GATS)
Why Care About China?

Reason 2: Ag is comparative advantage for US, not for China

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

US: 3.2 million
Iowa: 0.13 million
China: 270 million

Number of Farmers (Iowa=1)
- < 10
- 11 - 50
- 51 - 80
- 81 - 100
- > 100

Figure 2. Crop land per farmer in China in acres

US: 120 acres
Iowa: 200 acres
China: 1.4 acres

Cropland Per Farmer (Acres)
- < 1
- 1 - 1.5
- 1.5 - 2
- 2 - 3
- > 3

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
Why Care About China?

**Reason 3:** Chinese People Are Getting Richer, and will need more protein

1992 GDP per capita (PPP)

- **United States:** $37,283
- **China:** $1,846

U.S. GDP per capita was 20.2 times that of China

Bloomberg

2016 GDP per capita (PPP)

- **United States:** $53,417
- **China:** $14,275

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

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

![Graph showing meat consumption by country](image-url)
Future of High-Speed Rail in China
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>U-21%</td>
<td></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 produce 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).
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.
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
Seasonality of Soybean Imports by China

Due to the opposing harvest periods for soybeans in North versus South America, China is able to secure most of its soybean purchases from Brazil from now through October, when the new U.S. crop will be available for export. But China's massive monthly soybean needs mean the country may struggle to rely on South America alone for long.

If the disputes were resolved before harvest, we might be OK

(Tariff effective July 6th)

Source: China Customs, Thomson Reuters Eikon
Why Care About China?

Reason 5: Trade disputes with China have long-term impacts (chicken, beef)

Figure 1. Chicken Trade between the United States, China, and the Rest of the World (ROW)

Why Care About China?

Reason 6: Chinese Ag Policy Presents Future Demand that could be filled by our competitors

China’s projected corn import potential under the new 2020 E10 ethanol mandate
China’s Ethanol Industry in 2016

4th largest producer – 1 Bil gal.
- After US, Brazil and EU
- Corn ethanol 64%
- Also uses cassava, sorghum, corn stover
- Imported 225 mil. gal, mainly from U.S.
- Tariff rose from 5% to 30%

China consumes 40 bil. gal gasoline; 1 bil. gal ethanol in 2016
What a World w/o Trade War Look Like?

Table 1. Decline of Selected U.S. Exports to China from Peak Values

<table>
<thead>
<tr>
<th>Product</th>
<th>2017 value ($million)</th>
<th>Peak value (Year)</th>
<th>Percent change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton</td>
<td>976</td>
<td>3,429 (2012)</td>
<td>-72%</td>
</tr>
<tr>
<td>Distiller Grains</td>
<td>63</td>
<td>1,632 (2015)</td>
<td>-96%</td>
</tr>
<tr>
<td>Coarse Grains (ex. corn)</td>
<td>836</td>
<td>2,115 (2015)</td>
<td>-60%</td>
</tr>
<tr>
<td>Corn</td>
<td>142</td>
<td>1,310 (2012)</td>
<td>-89%</td>
</tr>
<tr>
<td>Wheat</td>
<td>349</td>
<td>1,283 (2013)</td>
<td>-73%</td>
</tr>
<tr>
<td>Poultry</td>
<td>36</td>
<td>722 (2008)</td>
<td>-95%</td>
</tr>
<tr>
<td>Soybean Oil</td>
<td>24</td>
<td>395 (2010)</td>
<td>-94%</td>
</tr>
<tr>
<td>Ethanol</td>
<td>42</td>
<td>313 (2016)</td>
<td>-87%</td>
</tr>
<tr>
<td>Others</td>
<td>21,626</td>
<td>25,927</td>
<td>-17%</td>
</tr>
<tr>
<td>Total</td>
<td>24,095</td>
<td>37,125</td>
<td>-35%</td>
</tr>
</tbody>
</table>

Source: USDA FAS Database
The Export Potential to China if China removes trade barriers

### Table 4. Predicting China's Import Potential using Domestic Supply and Demand Elasticities

<table>
<thead>
<tr>
<th></th>
<th>Increase in import quantity</th>
<th>Increase in import value ($billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>Middle</td>
</tr>
<tr>
<td><strong>Corn</strong></td>
<td>16.8 MMT</td>
<td>33.6 MMT</td>
</tr>
<tr>
<td><strong>Wheat</strong></td>
<td>13.2 MMT</td>
<td>26.4 MMT</td>
</tr>
<tr>
<td><strong>Beef</strong></td>
<td>0.3 MMT</td>
<td>0.7 MMT</td>
</tr>
<tr>
<td><strong>Pork</strong></td>
<td>3.0 MMT</td>
<td>6.0 MMT</td>
</tr>
<tr>
<td><strong>Chicken</strong></td>
<td>0.7 MMT</td>
<td>1.3 MMT</td>
</tr>
<tr>
<td><strong>Cotton</strong></td>
<td>55 TMT</td>
<td>110 TMT</td>
</tr>
<tr>
<td><strong>Ethanol</strong></td>
<td>0.11 Mil. L</td>
<td>0.22 M. L</td>
</tr>
<tr>
<td><strong>Distiller grains</strong></td>
<td>0.66 TMT</td>
<td>1.33 TMT</td>
</tr>
<tr>
<td><strong>Others</strong></td>
<td>0.87</td>
<td>1.7</td>
</tr>
</tbody>
</table>

Note: Projections for corn, wheat, beef, pork, and chicken are from the domestic elasticity method; projections for cotton, ethanol, distiller grains, and others are from the import elasticity method. See text for descriptions.

**MMT**: Million Metric Ton; **TMT**: Thousand Metric Ton; **Mil. L**: Million Liters
Iowa Farmland Ownership Survey

#ISULandValue

June 28 News Conference

http://www.card.iastate.edu/farmland

Corn Use for the Next Decade

Source: USDA-OCE
Soybean Use for the Next Decade

Source: USDA-OCE
Arable Land

Inherent Land Quality Assessment

IOWA STATE UNIVERSITY
Extension and Outreach

CARD
Center for Agricultural and Rural Development
Share of U.S. Agriculture Exported in 2016

- >70% Cotton
- >70% Tree Nuts
- >30% Grapes
- 15% Apples
- >20% Cherries
- >50% Wheat
- >50% Sorghum
- >50% Rice
- 15% Cotton
- 15% Corn
- 20% Pork
- 15% Dairy
- 15% Poultry
- 10% Beef

More than 20% of total U.S. agricultural production is exported annually.

Twitter: @USDAForeignAg  Website: www.fas.usda.gov
Source: USDA-FAS Global Agricultural Trade System (GATS)
Why do U.S. farmers need export markets?

• That’s where the customers are
• That’s where the economic growth is
• That’s where the consumption growth is
• We produce surpluses
• We only eat high on the hog
• Exports are crucial to farm income
96% of the world’s population lives outside the US

- Rest of the World: 34%
- China: 19%
- India: 17%
- Other Asia: 26%
- U.S.: 4%

Source: CIA World Factbook
Population growth 2017 to 2050

Source: World Bank
Economic growth rates

Source: CIA World Factbook
Income growth will drive increased global demand

**Households w/ Real PPP incomes greater than $20,000 (millions)**

<table>
<thead>
<tr>
<th>Country</th>
<th>2016</th>
<th>Proj. gains by 2026</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>151</td>
<td></td>
</tr>
<tr>
<td>India</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>Indonesia</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Russia</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Mexico</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Brazil</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Egypt</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Turkey</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>South Korea</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Thailand</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Philippines</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Taiwan</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Malaysia</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Vietnam</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Colombia</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Data: Global Insight’s Global Consumer Markets data.
Corn Export Shifts

Source: USDA-FAS
Soybean Export Sales

Million bushels

Week

9/1
10/1
11/1
12/1
1/1
2/1
3/1
4/1
5/1
6/1
7/1
8/1

2015
2016
2017

Source: USDA-FAS
Soybean Export Shifts

- China: -20.2%
- EU: -10.2%
- Japan: -1.3%
- Mexico: 21.4%
- Indonesia: 12.5%
- Egypt: 179.0%
- Taiwan: 29.3%
- Thailand: 45.9%
- Pakistan: 92.9%
- Vietnam: 45.6%
- Other: 14.5%

Total: 4.7%
Soybean Trade Last Year

- China: 61%
- Other: 12%
- Mexico: 6%
- EU: 7%
- Indonesia: 3%
- Japan: 4%
- Taiwan: 1%
- Egypt: 2%
- Thailand: 2%
- Pakistan: 1%
- Vietnam: 1%

Source: USDA-FAS
Soybean Trade This Year

Source: USDA-FAS
Sorghum Export Shifts

1,000 Metric Tons

- China: 21.3%
- Japan: 24.9%
- EU: 0.0%
- Colombia: 0.0%
- Taiwan: 454.5%
- Vietnam: 0.0%
- South Korea: 0.0%
- South Africa: -73.7%
- Mexico: -55.3%
- Other: -35.7%
- Total: 16.9%

Source: USDA-FAS
Pork Export Shifts

Source: USDA-FAS
Beef Export Shifts

Source: USDA-FAS
Ethanol Exports

Source: EIA
Top ten US ag export markets, 2016

Vietnam
Indonesia
Taiwan
Hong Kong
South Korea
Japan
European Union-28
Mexico
Canada
China

Source: US Census Bureau, Foreign Trade Statistics, FATUS export aggregations
Top 10 ag exporting states, 2016

Population vs. arable land

<table>
<thead>
<tr>
<th>Country</th>
<th>Share of global population</th>
<th>Share of global arable land</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>19%</td>
<td>5%</td>
</tr>
<tr>
<td>India</td>
<td>17%</td>
<td>10%</td>
</tr>
<tr>
<td>US</td>
<td>4%</td>
<td>13%</td>
</tr>
</tbody>
</table>
Thank You!

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