

# **Impacts of Possible Chinese Protection of 25 Percent on US Soybeans and Other Agricultural Commodities**

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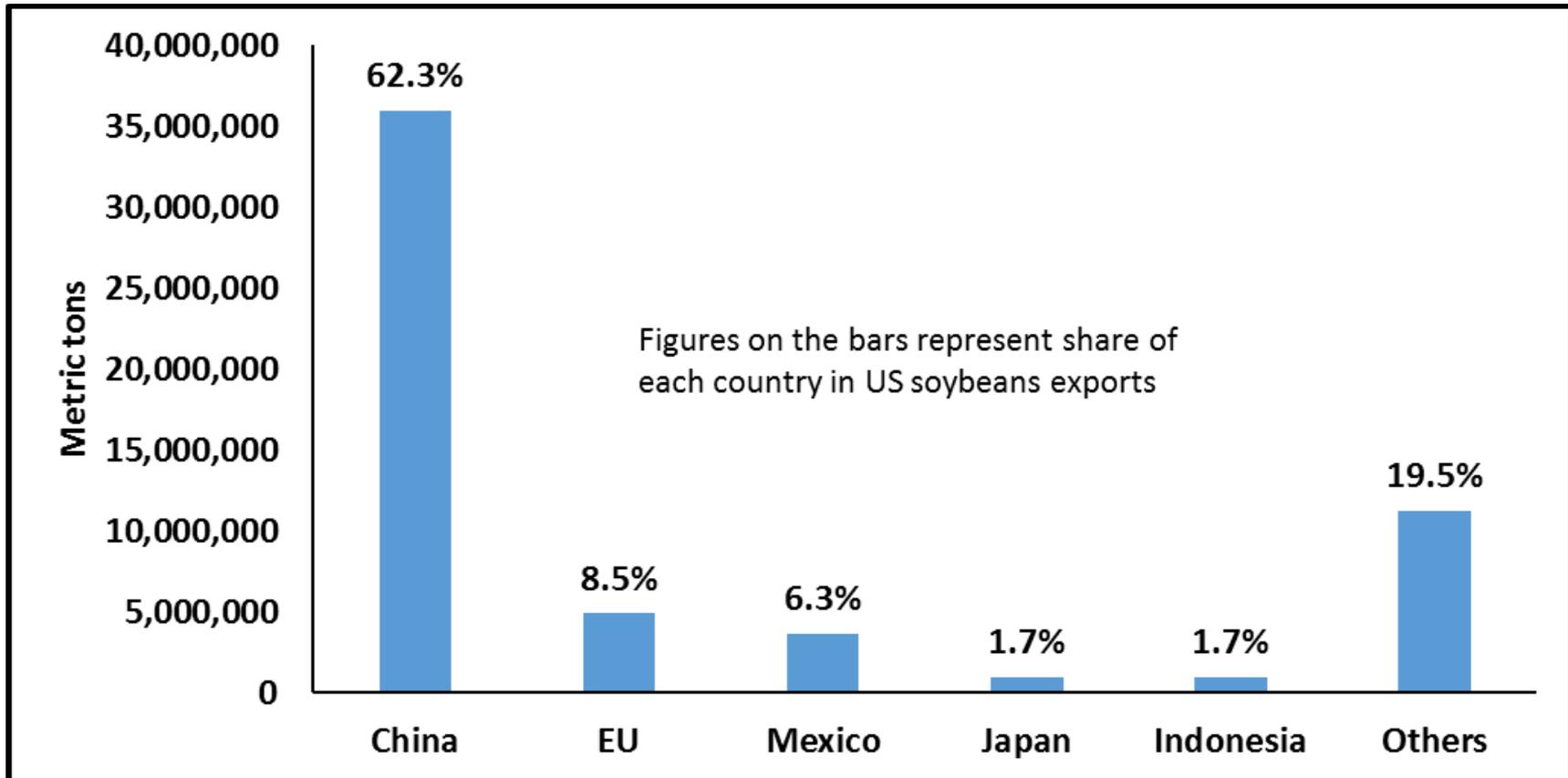
# Study Objectives

- Our aim was to estimate the medium term impacts of Chinese imposition of a 25% tariff on US soybeans, corn, wheat, sorghum, and beef.
- The study was funded by the US Soybean Export Council

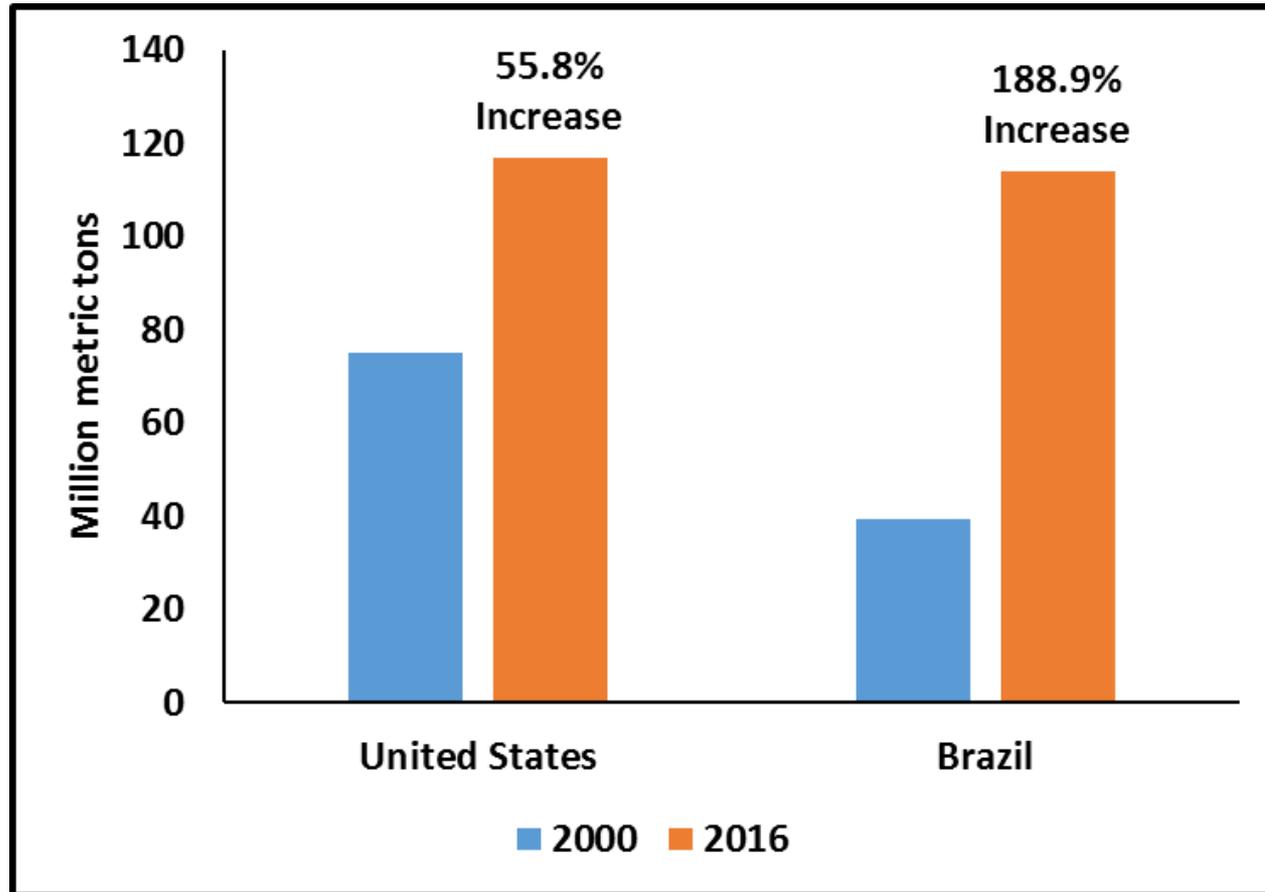
# China is World's Largest Soybean Market

- China imported 93.5 MMT in 2016, about 65% of global soybean imports.
- These imports mainly come from US (42%), Brazil (44%), and Argentina (9%).
- In 2016, total US exports were 59.2 MMT and for Brazil 63.1 MMT.

# US Soybean Exports – Major Destinations



# US and Brazilian Soybean Production Increase, 2000-16



# Analytical Approach

- We used the GTAP model developed and housed at Purdue for this analysis
- It is a global computable general equilibrium model covering 140 countries/regions and 57 commodities
- For this analysis, we aggregated to 6 regions: US, EU, Brazil, China, South America, Rest of World

# Data

- The latest public version of the GTAP data base is 2011.
- Lots has happened in the agricultural commodity production/trade world since then, so we updated the data base to 2016.
- We updated all important variables including GDP, population, capital formation, crop area and production, and trade

# Trade Elasticities

- GTAP and most CGE models use what is called an Armington structure for trade – meaning that imports are not perfect substitutes for domestic goods and goods from different countries are not perfect substitutes for each other.
- The other approach is called homogeneous goods in which imported and domestic goods are perfect substitutes.

# Armington Elasticity Values

- The GTAP model and data base has a default set of Armington elasticities.
- However, some recent literature suggests that these may be too low for soybeans.
- We did all the simulations with the base and elevated soybean Armington elasticity cases.

Shares of export in US production and shares of China in US export for targeted crops (figures are in quantity %)

Commodities	Share of export in US production	Share of China in US export
Wheat	45.6	3.8
Sorghum	50.1	78.8
Corn	14.4	0.5
Soybeans	50.6	62.3

# Cases Evaluated

- **Case 1:** A 25% increase in Chinese tariff on soybeans imported from US with the standard GTAP trade elasticities.
- **Case 2:** A 25% increase in Chinese tariff on soybeans imported from US with the elevated trade elasticities for Soybeans.
- **Case 3:** A 25% increase in Chinese tariff on wheat, sorghum, corn, soybeans, and beef imported from US with the standard GTAP trade elasticities.
- **Case 4:** A 25% increase in Chinese tariff on wheat, sorghum, corn, soybeans, and beef imported from US with the elevated trade elasticities for Soybeans.

# Trade Impacts

- Chinese imports of US soybeans fall substantially under both cases, but the changes are much larger for the elevated elasticities. The range is a reduction of 48-91%.
- The total export decrease is not as large as the decline in Chinese imports as exports increase to some other regions. There is what is called trade diversion. For example, For the base elas., Chinese imports from the US fall 48%, but US global exports fall 24%.
- Global soybean imports decrease by a small percentage in both cases.
- Brazilian exports to China increase 18% and 36% in the base and elevated elasticity cases.

# Changes in US exports to China for targeted crops (metric tons)

Description	25% tariff only on soybeans		25% tariff on all targeted crops and beef	
	Standard trade elasticities	High soybean trade elasticities	Standard trade elasticities	High soybean trade elasticities
Wheat	48,538	62,570	-740,444	-737,694
Sorghum	27,405	42,627	-679,312	-675,361
Corn	5,793	8,235	-113,709	-112,299
Soybeans	-17,204,549	-32,629,093	-17,167,804	-32,604,612

# Production Impacts

- US soybean production falls 11 to 15%.
- Brazil soybean production increases 9 to 15%.
- Chinese soybean production increases 3 to 5%
- Declines are higher with the elevated Armington elasticities than with the base GTAP elasticities.
- When the tariffs are on the set of all targeted commodities, US production of wheat and corn still increase, but sorghum and beef production fall. The reductions in sorghum are significant in these cases.

# Price Impacts

- Price changes are larger with elevated Armington elasticities than with base GTAP elasticities, but the differences are not as large as for trade or production.
- Soybean price drops 4 to 5% in the US, increases 4 to 6% in Brazil, and increases 3 to 5% in China.
- The price changes for most other commodities in the US and China are small. However, all agricultural commodity prices increase in Brazil, some by relatively large percentages.
- When the tariff is applied to the set of all targeted commodities, the price of all the commodities fall around 1 to 2 percent in the US, and they increase more in Brazil. The price increases in China are lower.

# Welfare Impacts

Region	EV-soy-base	EV-soy-elev.	EV-all-base	EV-all- elev.
USA	-1,901.5	-2,604.4	-2,206.0	-2,903.6
EU27	-59.9	-196.1	15.9	-119.4
BRAZIL	1,525.4	2,753.2	1,531.9	2,756.6
China	-1,552.1	-3,167.0	-1,744.5	-3,363.5
S. America	670.9	1,374.9	671.9	1,375.5
Other	439.4	303.7	575.4	440.4
Total	-877.7	-1,535.8	-1,155.4	-1,814.1

# Summary of Impacts

Variable	Tariff on soybeans (cases 1 and 2)	Tariff on all targeted Commodities (Cases 3 and 4)
Change in quantity of China's soybean imports from US (%)	-69	-69
Change in quantity of total US soybean exports (%)	-29	-29
Change in quantity of US soybean production (%)	-13	-13
Change in US soybean producer price (%)	-4	-4
Change in US economic welfare (\$ billion)	-2.3	-2.6
Change in China economic welfare (\$ billion)	-2.4	-2.6
Change in Brazil economic welfare (\$ billion)	+2.2	+2.2

The tariffs are a lose-lose proposition – both the US and China lose about the same amount.

Brazil is the winner.

These are medium term impacts – not short term.

**Thanks!**

**Questions and Comments**