

U.S. Sorghum Transportation to Export Positions

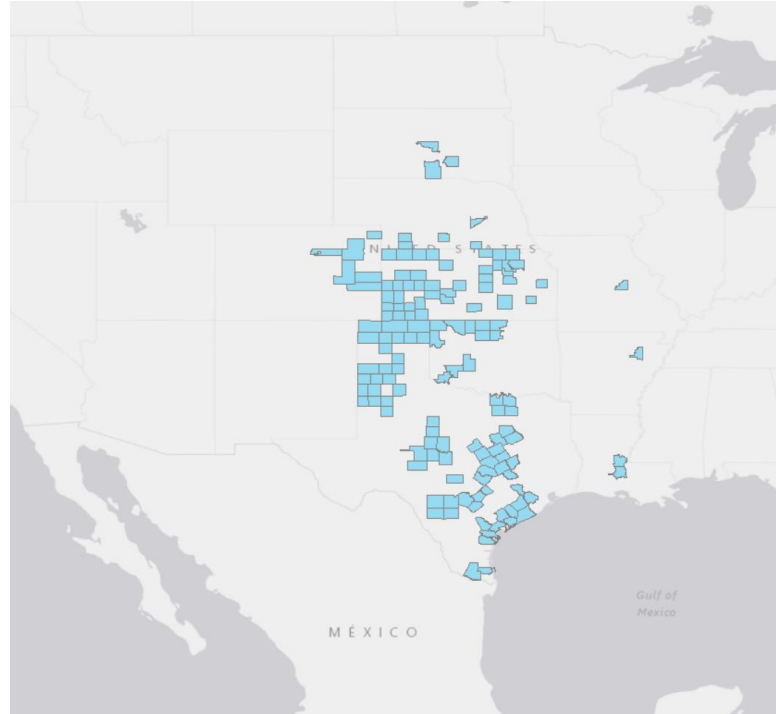
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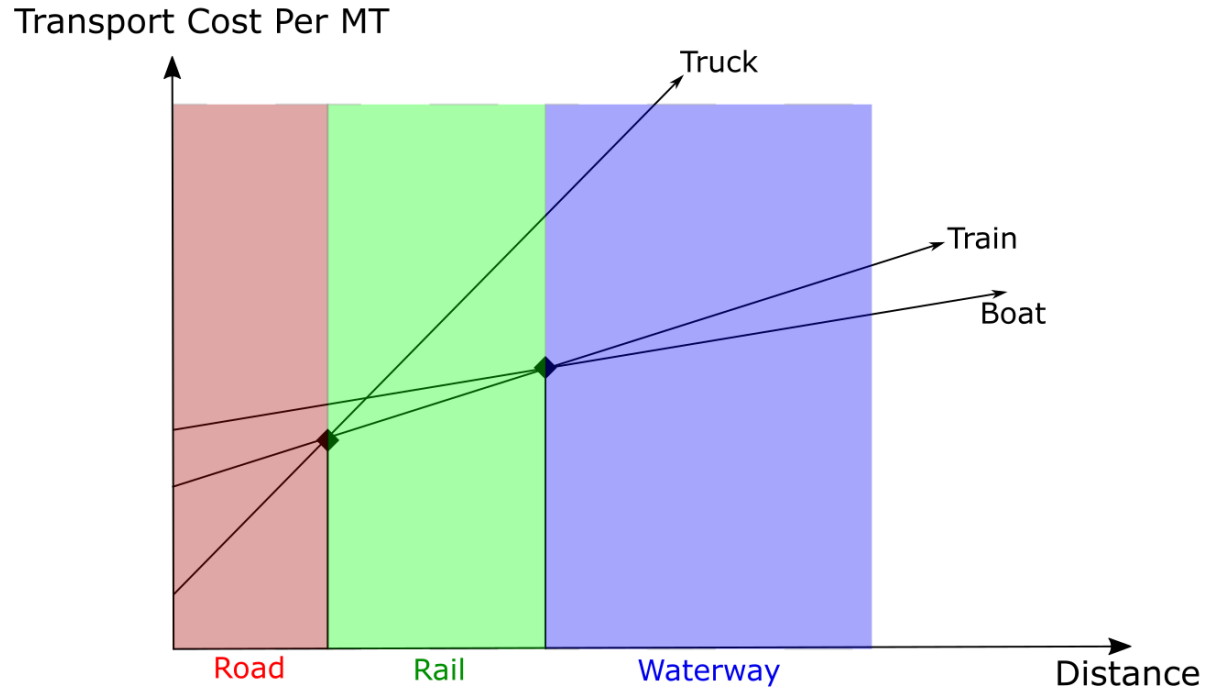
Presentation to Cochran Fellows

October 8, 2018

Main U.S. Sorghum Producing Counties



Freight Travel Modes



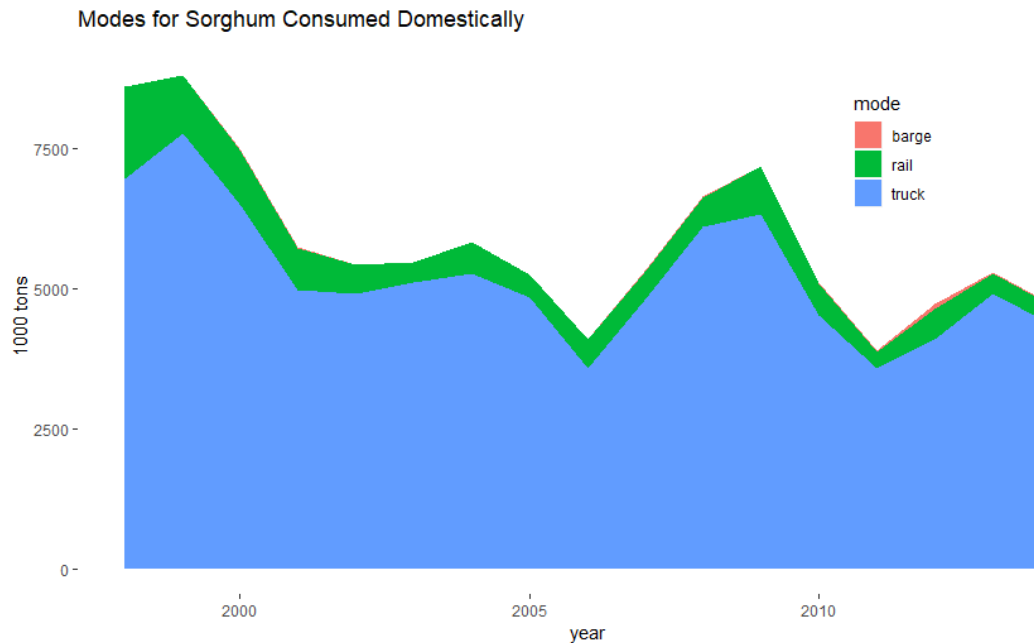
Freight Travel Modes

2012 Commodity Flow Survey: cereal grains from Kansas, Oklahoma, and Texas

- Truck: 90%
 - 139 miles on average
 - 57,000 lbs on average
- Rail: 9%
 - 795 miles on average
 - 2,182,367 lbs on average
- Boat: 1%
 - 952 miles on average
 - 2,451,765 lbs on average

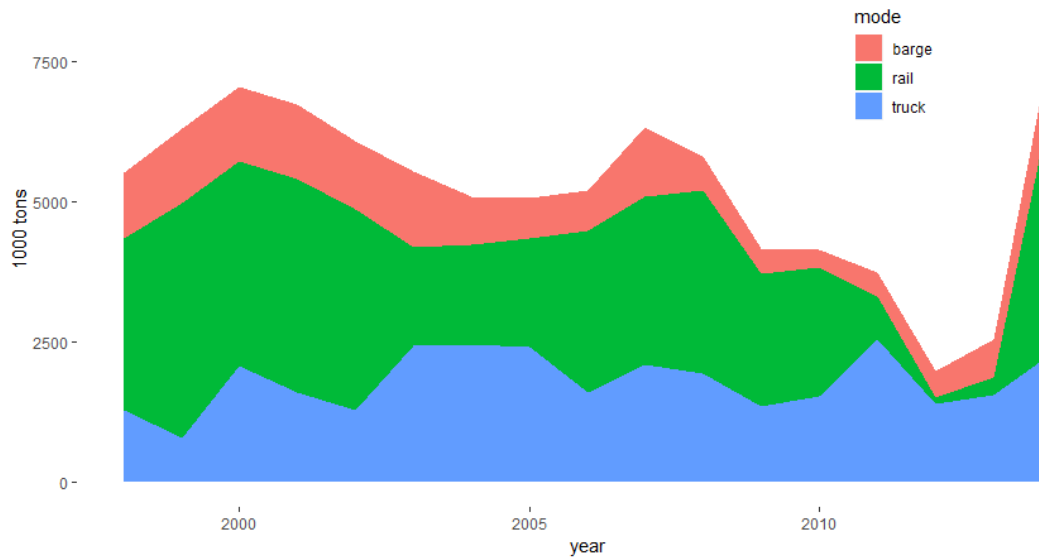


Final Movements



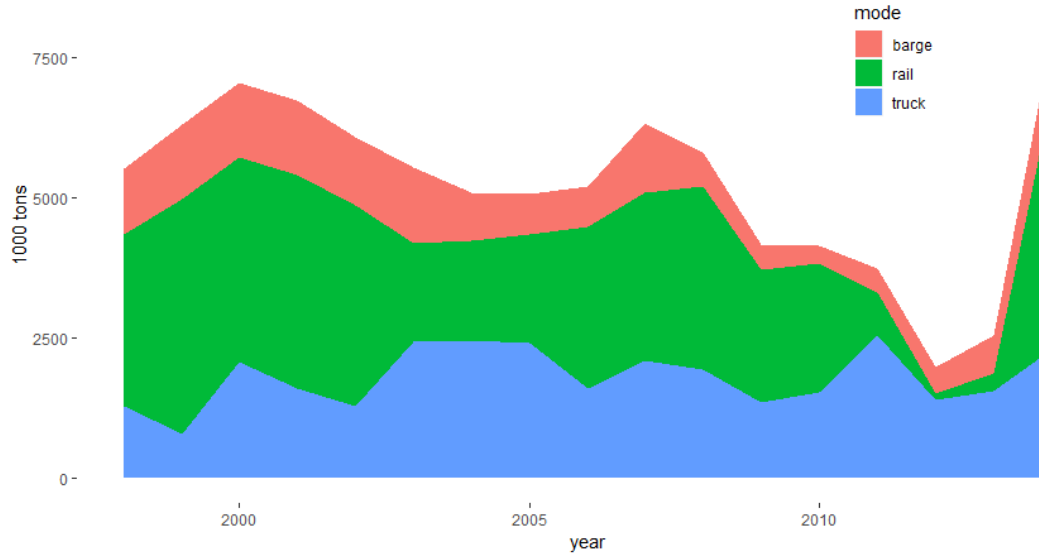
Final Movements

Modes for Sorghum Moved to Export Positions



Final Movements

Modes for Sorghum Moved to Export Positions



2014
 Barges = 690
 Rail Hopper Cars = 50,000
 Trucks = 105,000

Rail Shipments

More than half of rail shipments originate in Kansas

Texas receives more than 90% of rail shipments

- Domestic livestock use
- Exports to Mexico via rail
- Exports via ships

Figure 2: Sorghum Rail Shipments, Origins, 2014

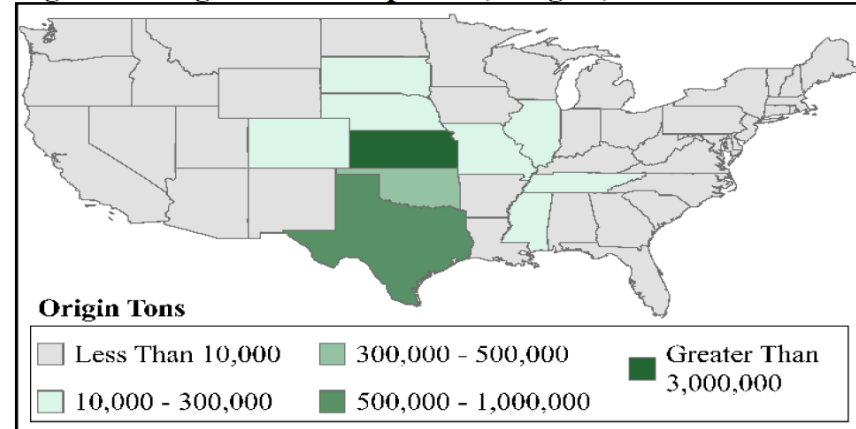
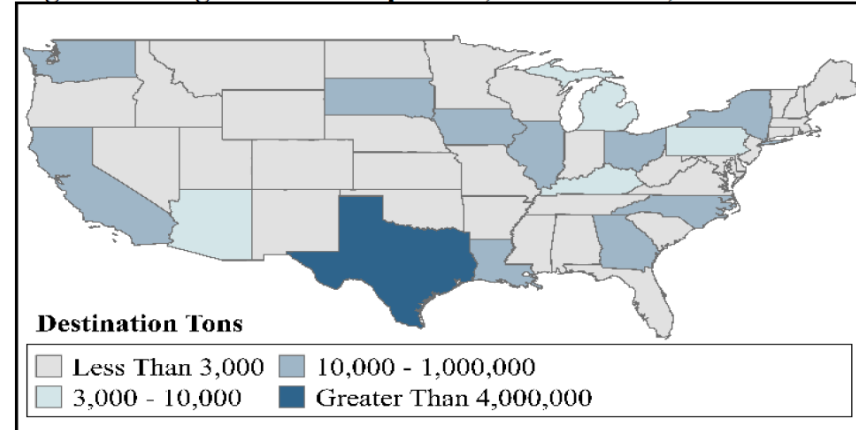


Figure 3: Sorghum Rail Shipments, Destinations, 2014



Source for maps: USDA/AMS/TSD analysis of the Surface Transportation Board's Confidential Waybill Sample, 2014.

Barge Shipments

Barge shipments are concentrated on the lower Mississippi

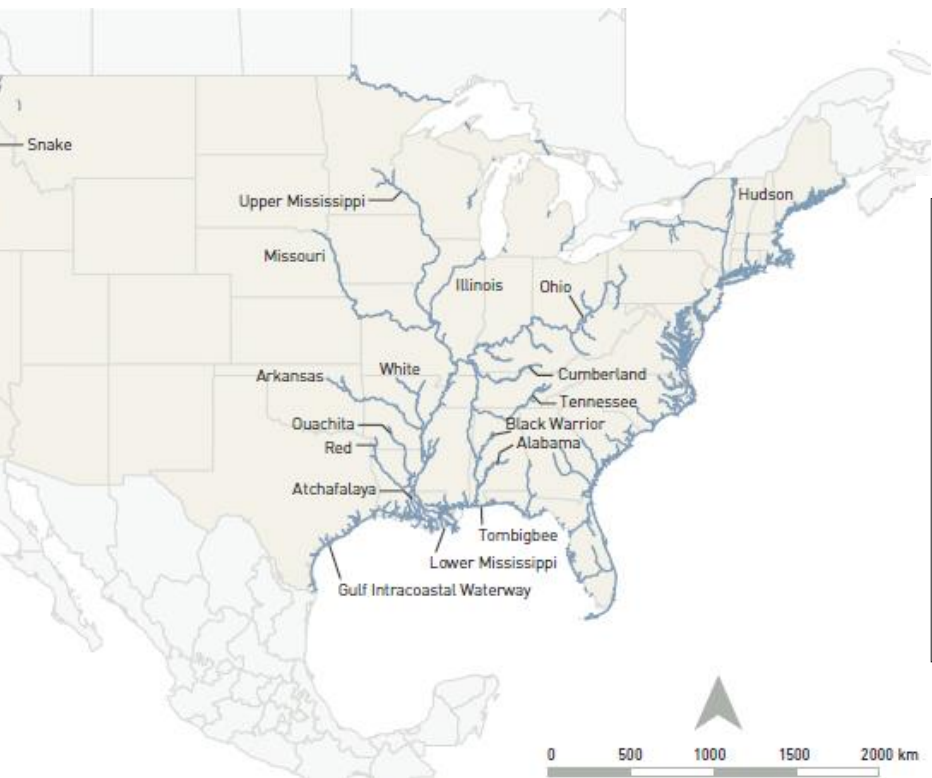


Table 1: Sorghum Barge Shipments, 2014 (in thousand tons)

Origin/Destination	Lower Mississippi	Others	Total
Arkansas River	106	2	108
Upper Mississippi	42	8	49
Lower Mississippi	880	5	886
Others	8	0	8
Total	1,036	15	1,051

Source: Waterborne Commerce Statistics; U.S. Army Corps of Engineers.
 Note: “Others” category includes movements on the Ohio River, Mermentau River (in southern Louisiana), Houston Ship Channel, and other rivers.

Top 25 U.S. Ports by Dry Bulk Tonnage



Gulf of Mexico Dry Bulk Ports

Top agricultural ports in this region are

- New Orleans
 - 5.1 million MT (23% of U.S. total) bulk grains exported
 - 5.3 million MT (38% of U.S. total) animal feed exported
- Houston
 - 2.9 million MT (13% of U.S. total) bulk grains exported
 - Top shipping lines: Bulk Cargoes, Cargill International, BP Shipping
- Galveston
 - 1.2 million MT (5% of U.S. total) bulk grains exported
 - Top shipping lines: Bulk Cargoes and Southport Agencies
- Corpus Christi
 - 2.5 million MT (11% of U.S. total) bulk grains exported
 - Top shipping line: Bulk Cargoes

[2015 data]



Port Performance

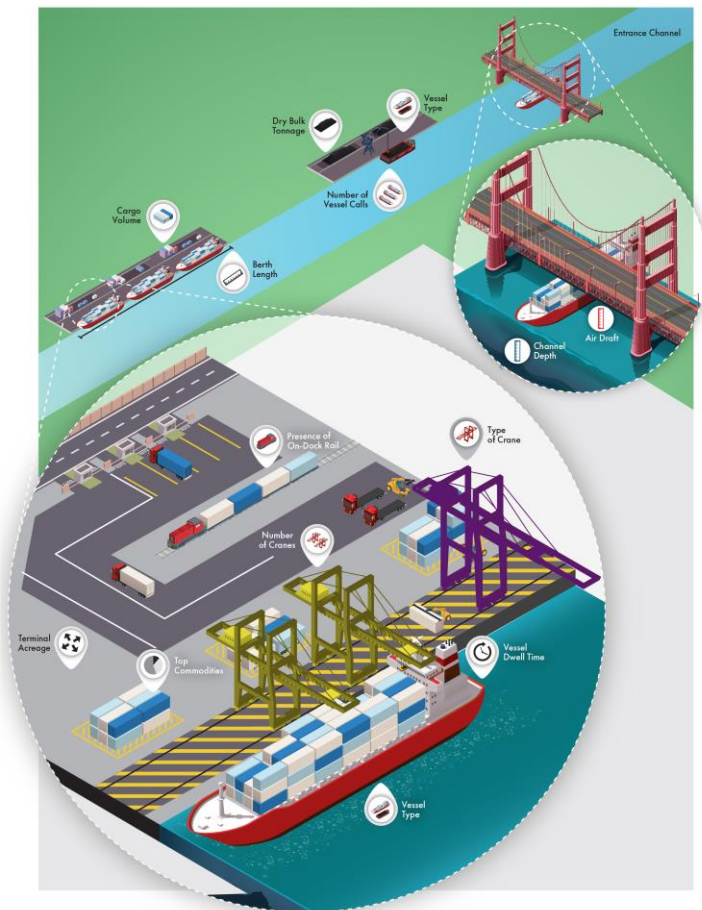
Throughput

- Measures cargo or number of vessels over time
 - Annual dry bulk tonnage
 - Average vessel dwell time

Physical Capacity

- Measures of maximum throughput in a single time period
 - Channel depth
 - Can change based on weather
 - Number and types of cranes
 - Presence of rail facilities on the dock
 - Container terminal size
 - Acres

Some substitutability between storage availability at the port and loading/unloading facilities



Ocean Freight Market Types

Tramp

- Usually bulk vessels in charter service

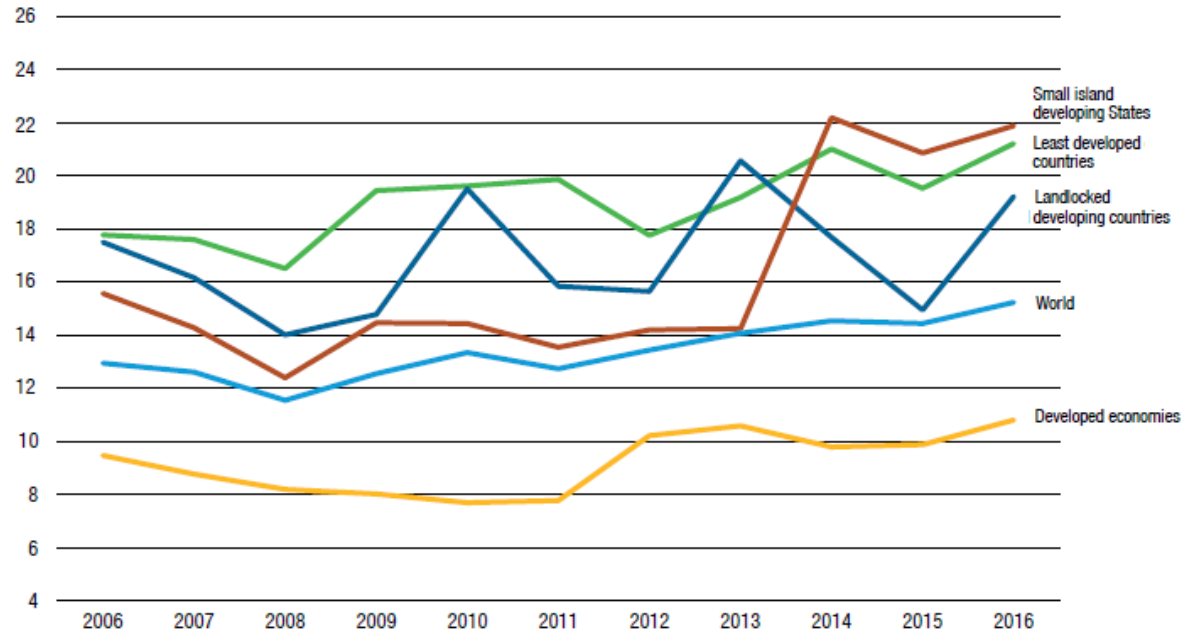
Liner

- Usually general cargo vessels that follow a predetermined schedule and route
- Very popular for container service



Shipping Costs

Figure 3.5. Transport and insurance costs of international trade, 2006–2016
(Percentage share of value of imports)

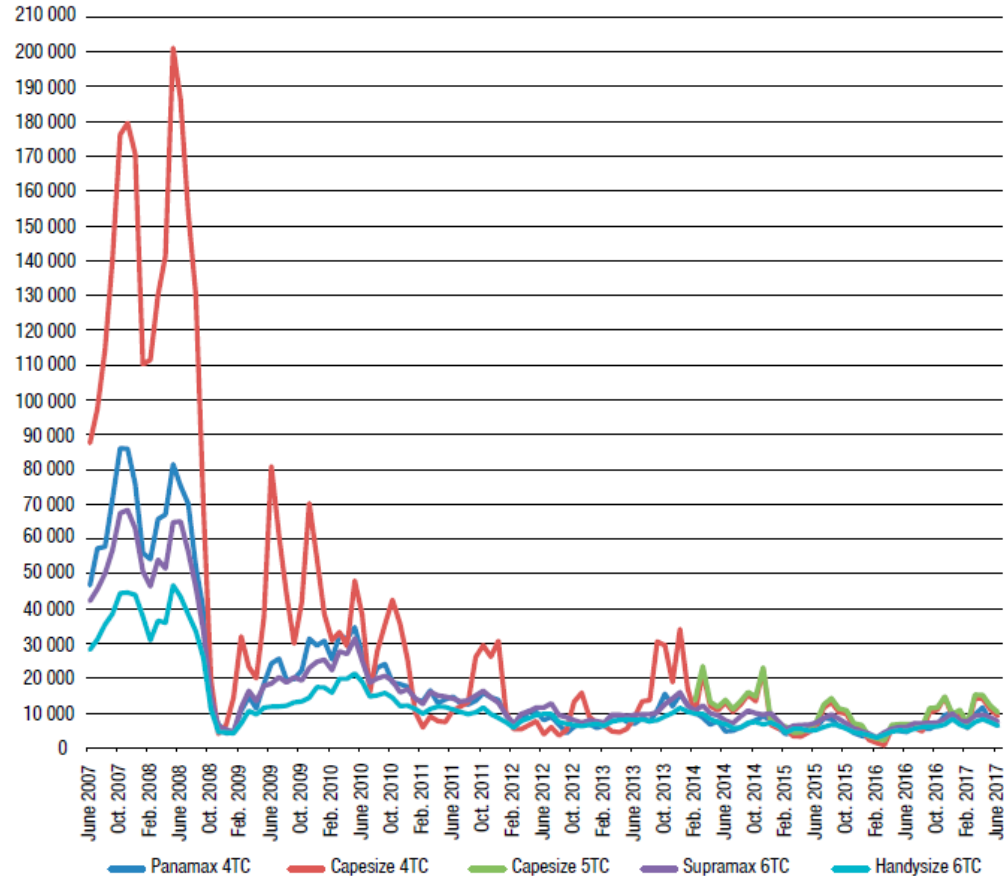


Source: UNCTAD secretariat calculations.

Note: All modes of transport; the least developed countries grouping includes 48 countries for all periods up to 2016.

Shipping Costs

Figure 3.4. Daily earnings of bulk carrier vessels, 2007–2017 (Dollars per day)

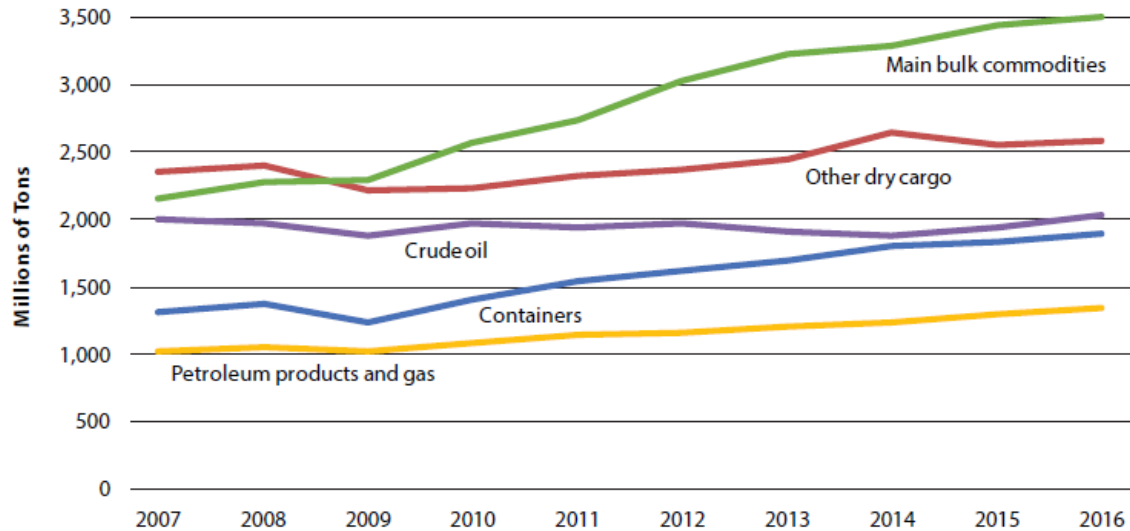


Source: UNCTAD secretariat calculations, based on data from Clarksons Research Shipping and the Baltic Exchange.

Abbreviations: Panamax 4TC and Capesize 4TC, average rates of the four time charter routes; Capesize 5TC, average rates of the five time charter routes; Supramax 6TC and Handysize 6TC, average rates of the six time charter routes.

Ocean Shipping Trends

Figure 4-4 World Seaborne Trade in Tons by Category, 2007-2016

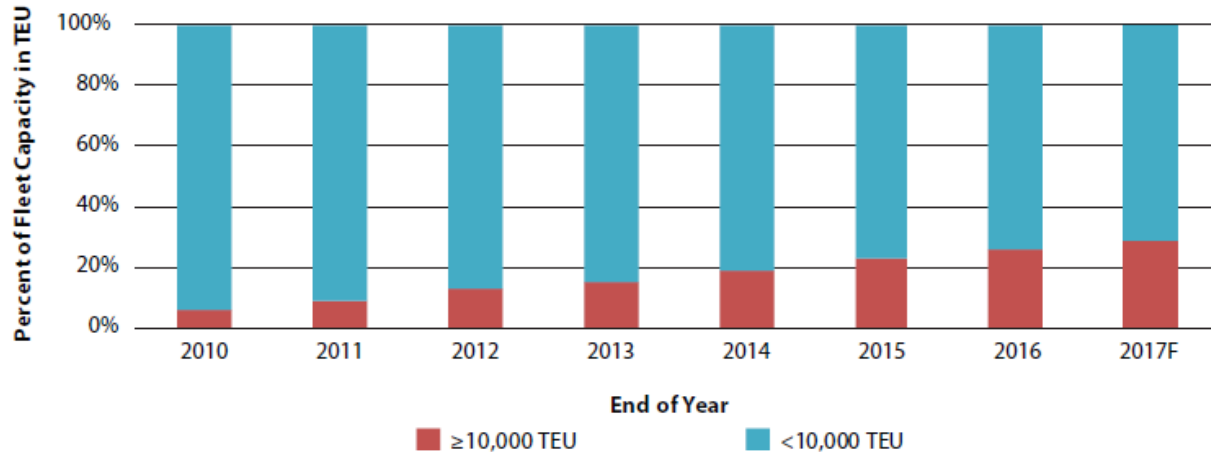


NOTE: Main bulk commodities include iron ore, coal, bauxite and alumina, grain, and phosphate rock. Other dry bulks include forestry and steel products, cement, etc.

SOURCE: United Nations Conference on Trade and Development (UNCTAD), *Review of Maritime Transport: 2017* available <http://unctad.org/> as of November 30, 2017.

Ocean Shipping Trends

Figure 4-7 Fleet Capacity Share by Vessel Size Class: 2010-2017



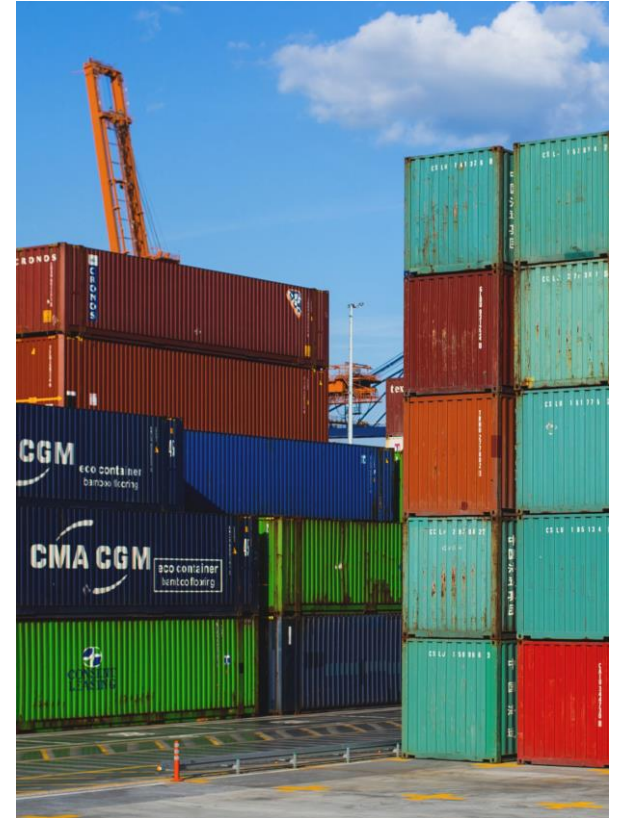
KEY: TEU =Twenty-foot equivalent unit, F = Forecast.

NOTE: 2017 data are forecast.

SOURCE: Alphaliner; *Alphaliner Monthly Monitor: December 2017*, available <https://www.alphaliner.com/> as of December 21, 2017.

Containerization?

- Containers must be modified for grain
 - Will have a bulkhead fitted to the doors
 - May have a plastic liner
 - Necessary for food grade shipments
- Inland transportation modes are rail and truck (not barge)
- Expands export options



Containers on Rail

Small but growing amount of U.S. grain shipped via container

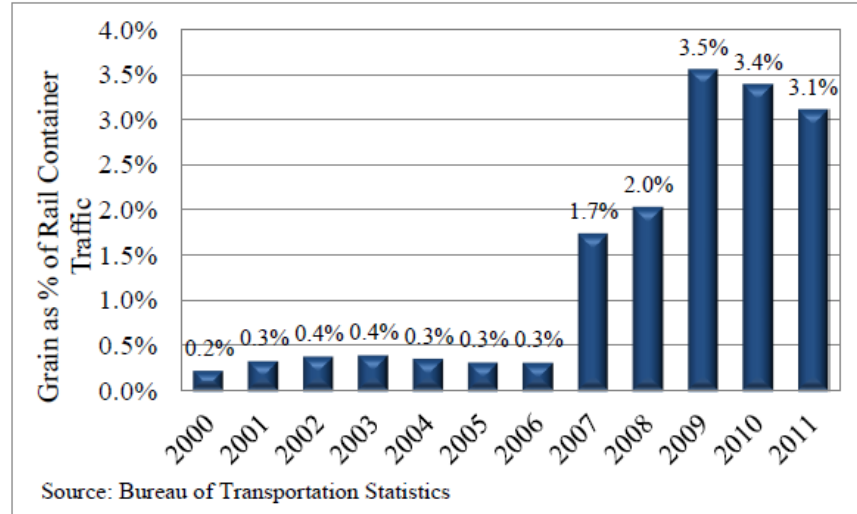
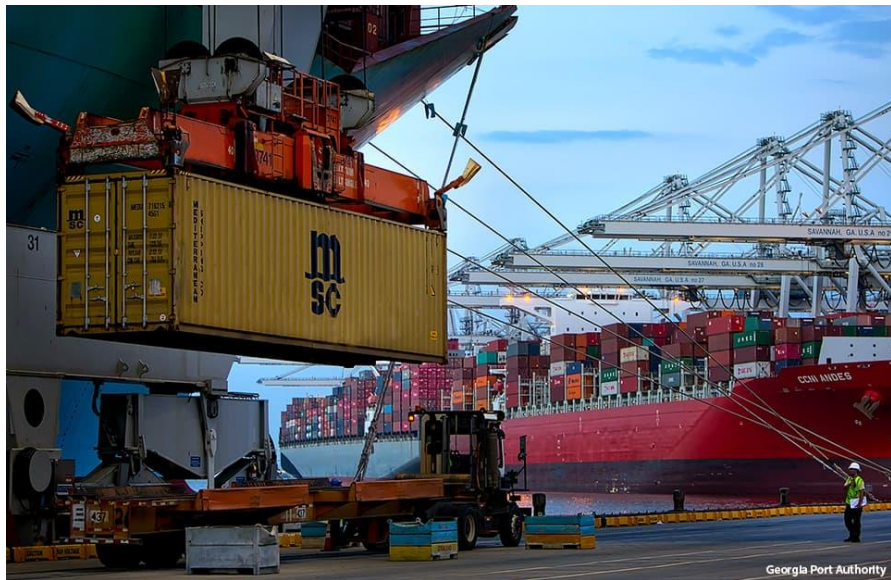


Figure 4.1 Farm Product STCC Group Share in All Rail Container Traffic

Containers on Ocean Freight



- New Orleans, LA
 - 1,232 TEU animal feed
- Houston, TX
 - 2,302 TEU animal feed
 - 2,232 TEU bulk grains
- **Savannah, GA**
 - **35,480 TEU animal feed**
 - Top shipping lines: Maersk, Mediterranean Shipping, MOL, CMA-CGM

[2015 data]

Container Exports

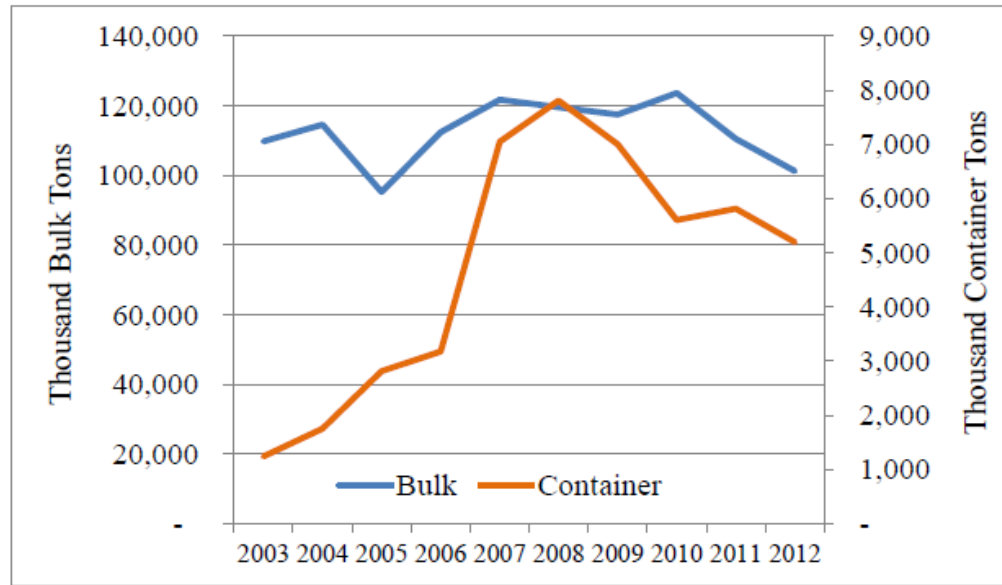


Figure 5.1 Grain Exports Shipments, Modal Trends

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