



DRAFT



# Framing the Issues in Port Congestion



April 15, 2015



# Moffatt & Nichol Background

## Established in 1945 in Long Beach, California, currently:

- Offices in The Americas, Europe, Middle East and Pacific Rim
- Practices: Goods Movement, Energy, Ports, Coastal, Urban Waterfronts & Marinas, Inspection & Rehabilitation

## Planning and design of marine and freight transportation

- Terminal design for all types of freight and passenger movement
- Freight planning and market analysis
- Investment/privatization analysis
- Strategic development plans
- Port selection/network analysis
- Coastal engineering
- Port and waterside construction (marinas)
- Railroads and capacity expansion
- Environmental issues/emission modeling
- Port security

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# Takeaways

- **Freight transportation congestion is a global problem that will worsen in 2015 and 2016 due to imbalances in infrastructure investment.**
- **Global economic outlook depends on emerging market consumers replacing aging developed economy consumers, which requires significant infrastructure investment.**
- **Some combination of transportation and water infrastructure investment is required to realize potential growth.**



# US has led global growth

After pulling the world economy into a severe recession, the US has been driving global economic recovery, more so in the last 12 months. Europe and Asia should be stepping soon and eventually commodity-exporting economies.

CONTRIBUTIONS TO CHANGES IN GLOBAL REAL GDP GROWTH: FIRST THREE QUARTERS OF 2014 COMPARED TO 2013

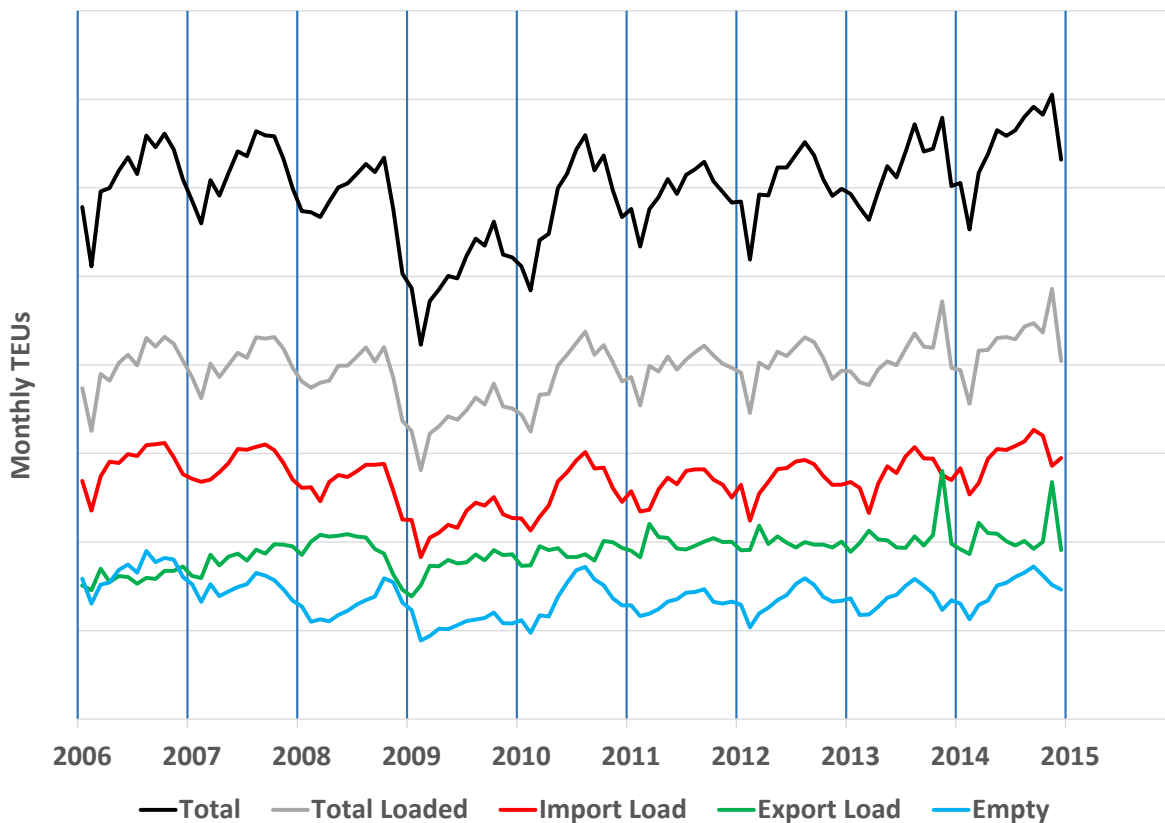




# Import volumes led US TEU growth in 2014

Imports drove volume growth in 2014, this shows how the US has been supporting global growth. But looking back to the years before the recession of 2008-2009, exports have performed a lot better. **It is worth noting that there are some months when loaded export TEUs almost exceed loaded import volumes**, which seems to have happened in November 2013.

## MONTHLY AND ANNUAL VOLUMES AT MAJOR US PORTS

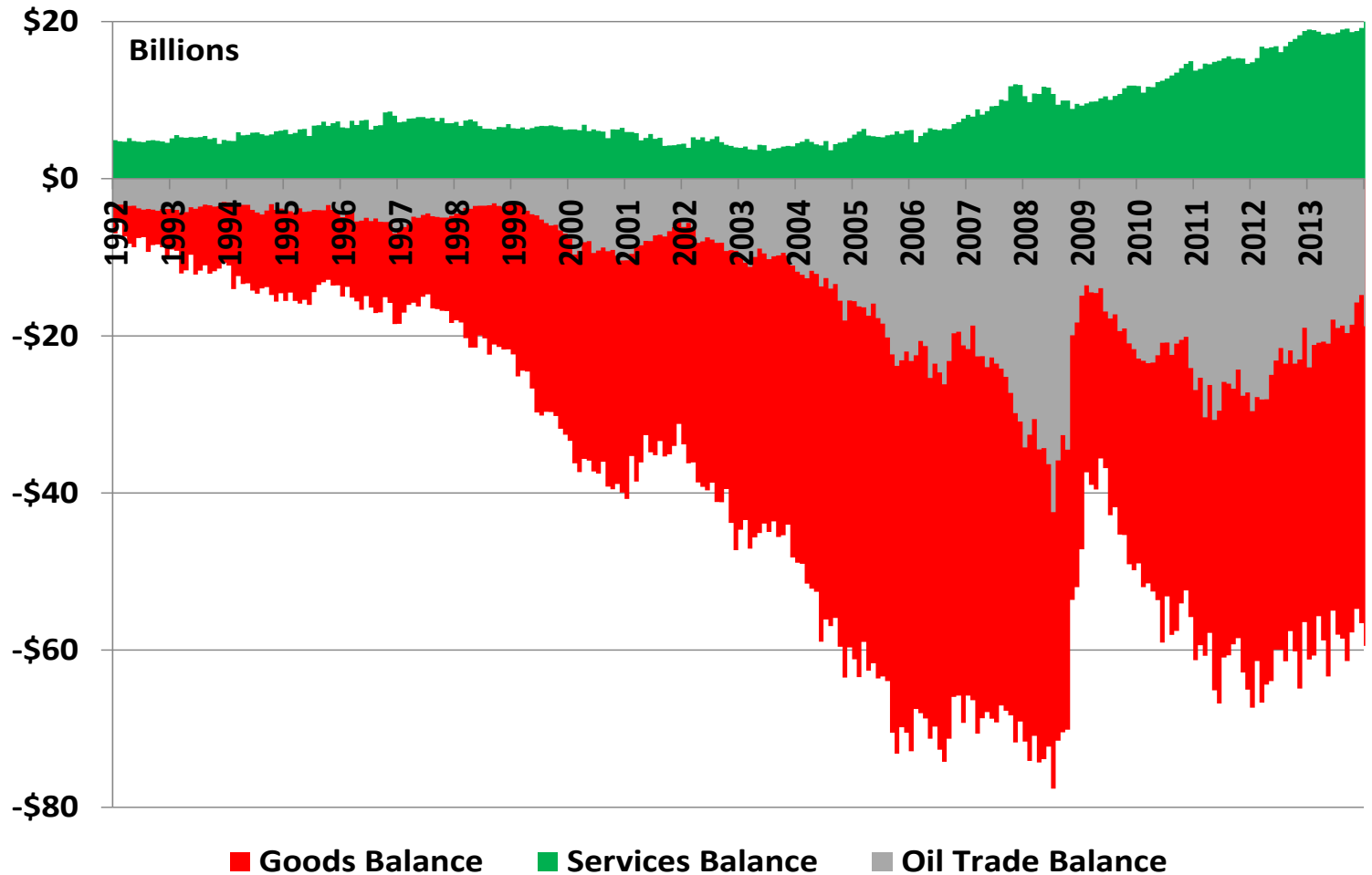


	Total	Total Loaded	Import Load	Export Load	Empty
2006	36,872,549	23,983,495	17,297,240	9,605,548	<b>9,969,762</b>
2007	<b>37,263,101</b>	<b>24,330,893</b>	<b>17,342,377</b>	10,989,446	8,931,278
2008	35,382,311	23,460,303	16,060,599	<b>11,581,306</b>	7,740,407
2009	30,368,529	20,448,389	13,444,526	10,476,419	6,447,584
2010	35,120,125	23,473,814	15,620,245	11,257,500	8,242,381
2011	35,650,253	23,936,498	15,780,519	<b>11,942,354</b>	7,927,380
2012	36,295,886	24,122,003	16,266,504	11,927,738	8,101,644
2013	37,227,612	<b>24,558,764</b>	16,645,540	<b>12,407,523</b>	8,174,549
2014	<b>38,973,674</b>	<b>25,460,244</b>	<b>17,783,189</b>	<b>12,344,626</b>	8,845,858
<b>2014 Growth</b>	4.7%	3.7%	6.8%	-0.5%	8.2%
<b>2006-14 CAGR</b>	0.7%	0.7%	0.3%	3.2%	-1.5%

# US developed a substantial trade deficit

The US has absorbed developing countries' need to export in order to grow and in the process developed a substantial persistent deficit. This is not just a US but also a global problem. Recently the US trade deficit improved due to the reduction in the oil trade balance but this will not be enough to balance US trade.

US TRADE BALANCE COMPONENTS: 1992-2014



→ 24% of the trade deficit is due to oil, used to be 40%

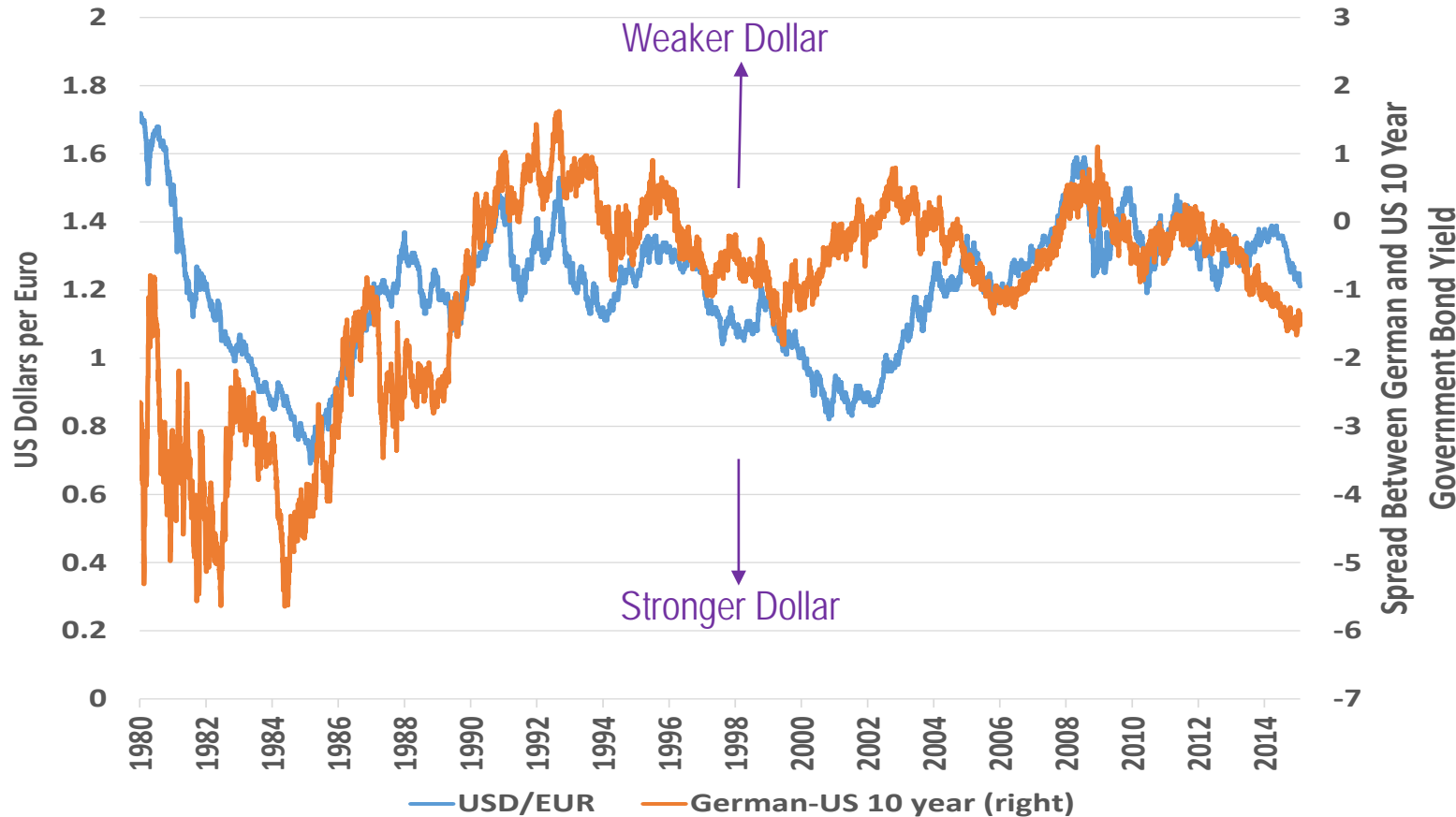




# Strengthening US Dollar may impact export competitiveness

With the US economy leading global growth and inflation, US interest rates are likely to rise ahead of interest rates in other currencies. As long as an economy is relatively stronger and this is reflected in rising (real) interest rates, its currency tends to strengthen. However, correlation between US Dollar strength and export growth is only mildly negative. Strong growth in export destination countries can overcome the effect of a strengthening US dollar. Investments in infrastructure can also make exports more competitive.

DOLLAR-EURO EXCHANGE RATE AND THE SPREAD BETWEEN US AND GERMAN GOVERNMENT BOND YIELDS



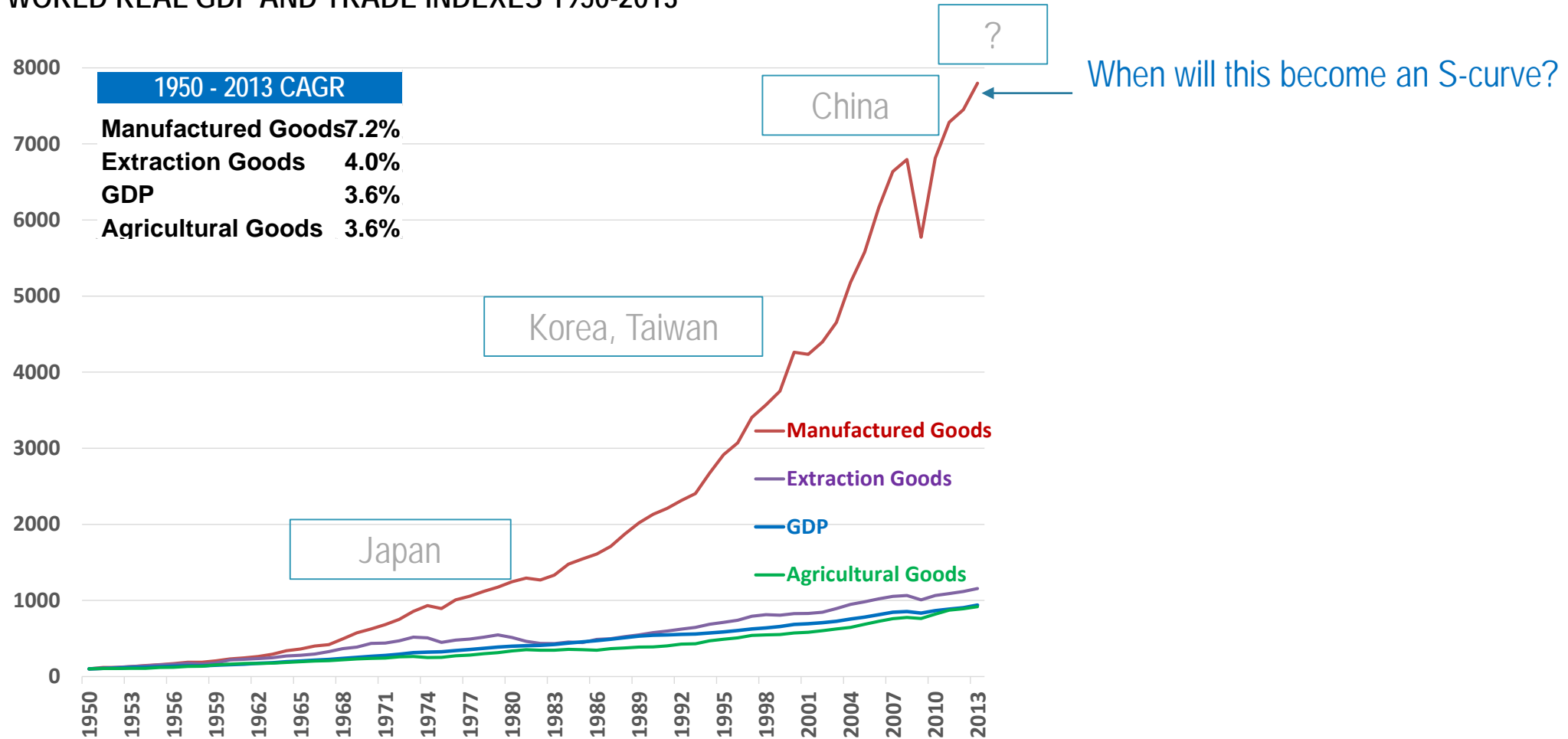


# The world wants to trade

From 1950 to 2013 manufactured goods trade has grown twice as fast real GDP. Among other trends, this is due to:

- Free Trade Agreements
- Information/Communication Technology
- Maritime and inland connectivity infrastructure
- Demographic trends

### WORLD REAL GDP AND TRADE INDEXES 1950-2013



Source: WTO, Moffatt & Nichol

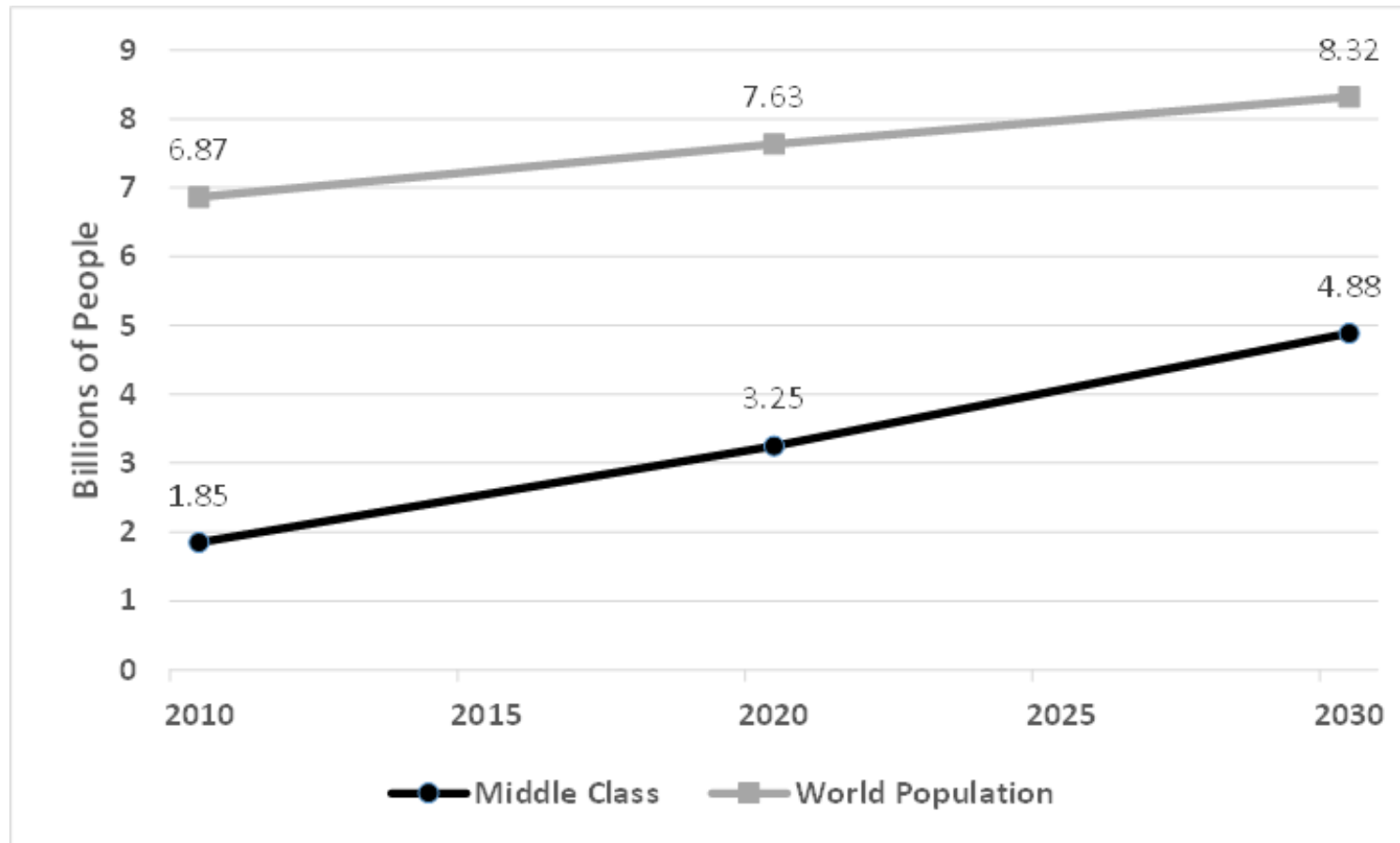




# The ultimate global logistics challenge

***Emerging markets are more than just large economies growing quickly, they are developing significant middle classes too. For the developed economies to sustain higher growth in the long term they have to focus on this market segment. Developed economies need growth in order to support their retirees... need more infrastructure and less waste if these forecasts are correct. This is the ultimate global logistics challenge.***

## WORLD POPULATION AND OECD GLOBAL MIDDLE CLASS PROJECTIONS

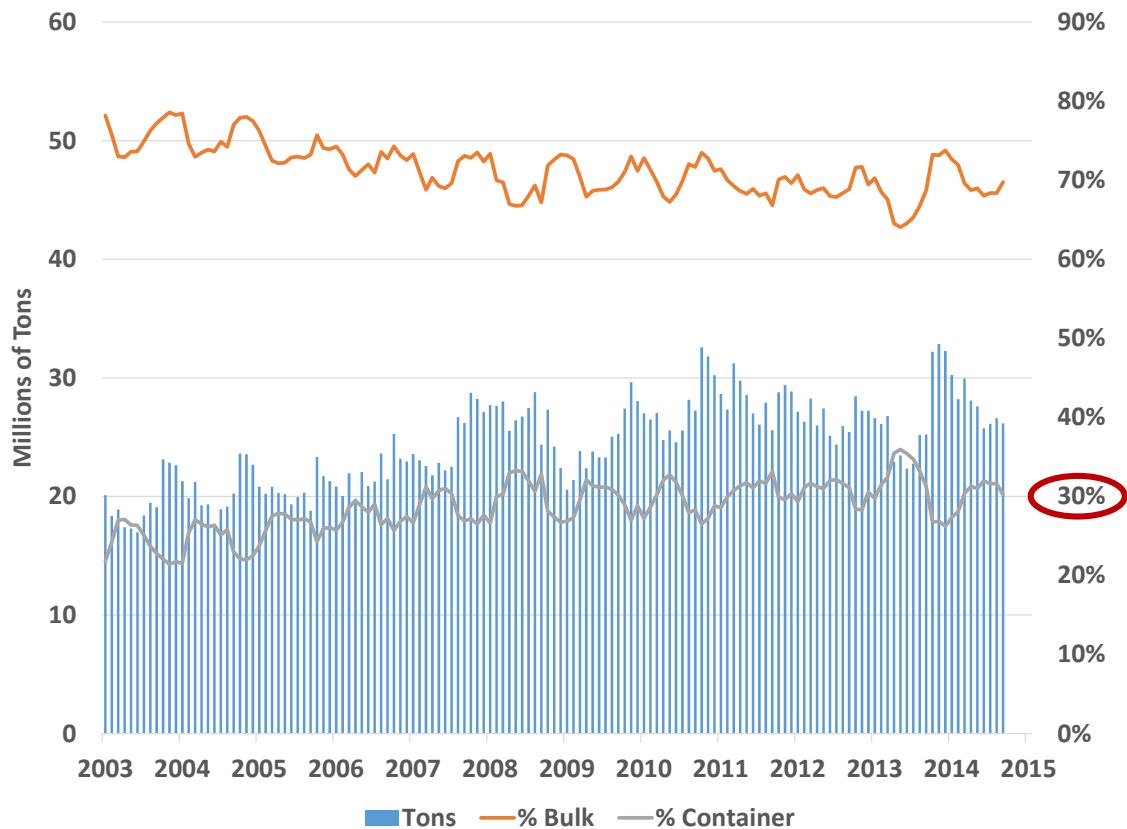




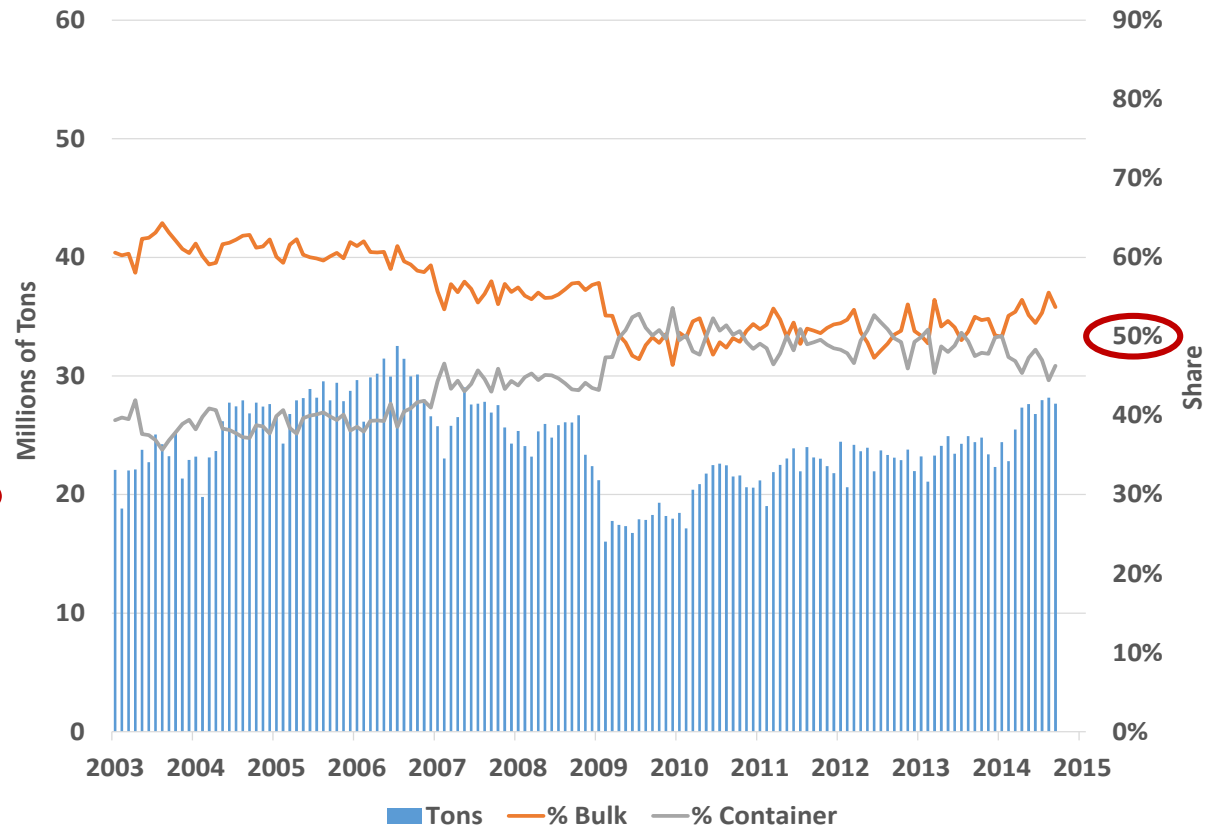
# Containerization Trends

Export and Import tonnage have grown at CAGRs of 3.7% and 1.4%, respectively, since 2003. Containerization rates have increased 5% for both exports and imports. Export tonnage has generally been higher than import tonnage. What would happen to containerized export volumes if the value of exports increased and container rates did not increase as much?

### EXPORT NON-ENERGY



### IMPORT NON-ENERGY



Source: Census Bureau, Moffatt & Nichol

# What can the US can competitively export?

**Agriculture, Capital goods and Energy.**

**Labor is more expensive and capital is cheaper in the US compared to fast growing emerging market economies such as China. The US has comparative (and competitive) advantages in the production of goods that use little labor. This is shown in the list of goods that the US has been prone to export.**

**This list applies to the Americas as well.**

## TOP 10 HIGH POTENTIAL US NET EXPORTS<sup>1</sup>

Containerized	Score
Wood Pulp Scrap and Waste	9.4
Oil Seeds (Soy)	1.1
Raw Hides And Leather	0.8
Cotton - Untreated, Yarn And Woven Fabric	0.7
Animal Feed	0.7
Meat and Other Edible Animal Parts	0.3
Plastics Feedstock and Manufactured Goods	0.2
Iron And Steel	0.1
Paper and Paperboard	0.1
Chemical Products	0.1
Cereals	0.1
Organic Chemicals	0.1

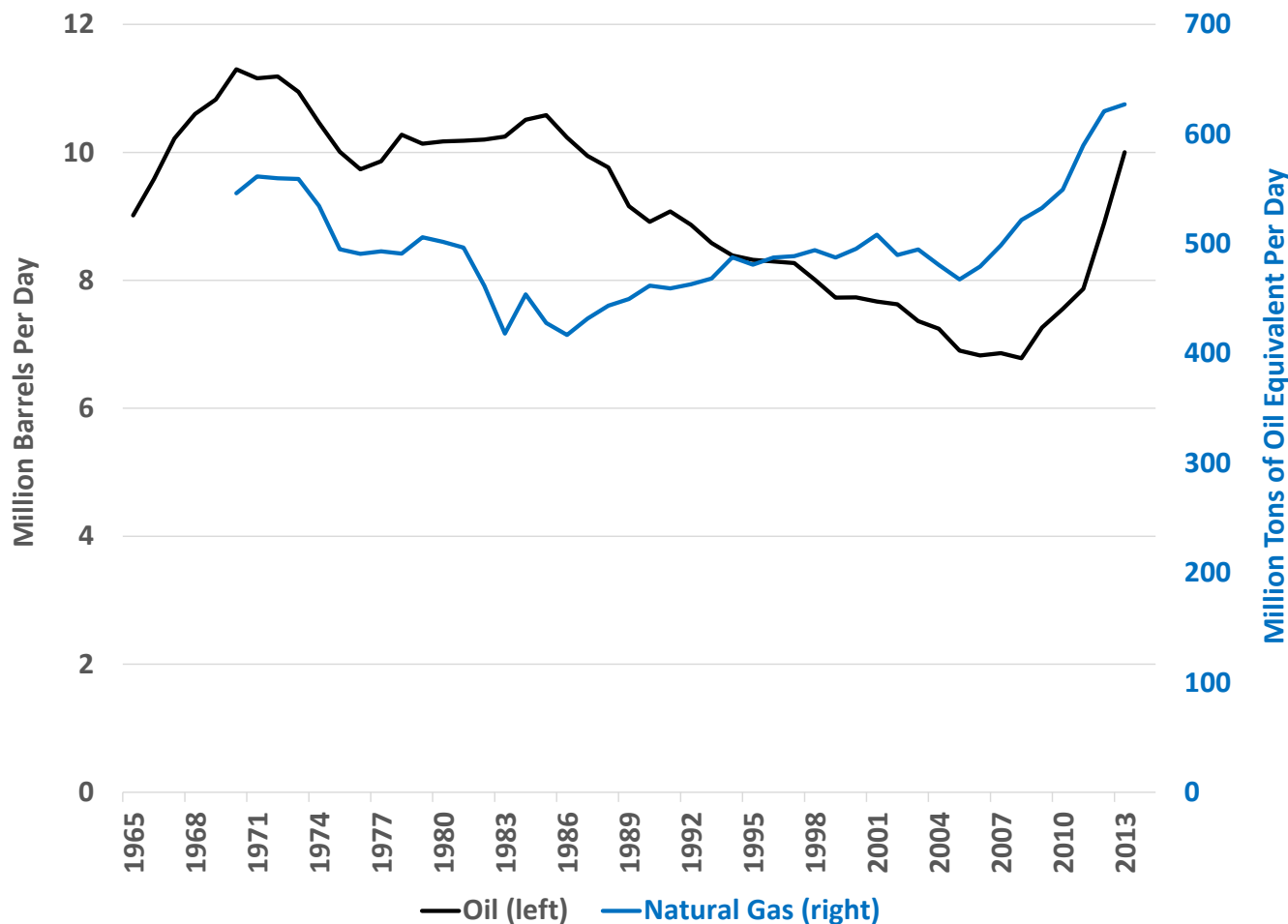
Bulk/Breakbulk	Score
Oil Seeds (Soy)	32.7
Meat and Other Edible Animal Parts	28.7
Cereal Grains	3.9
Animal Feed	3.4
Wood And Charcoal	0.4
Crude Oil and Refined Petroleum/Natural Gas Products	0.4
Live Animals	0.3
Wood Pulp Scrap and Waste	0.2
Fish and Crustaceans	0.2
Dairy Products, including Eggs and Honey	0.1
Organic Chemicals	0.1
Plastics Feedstock and Manufactured Goods	0.1

<sup>1</sup> Based on relative comparative advantage as defined by Bela Belassi

# Fracking has reversed oil and natural gas trends

US oil production is over 10% of global oil consumption and headed higher. Natural gas production has increased enough to decouple its price from oil in the US. Natural gas production is spurring production of resins and plastics and an industrial renaissance, supporting “on-shoring”

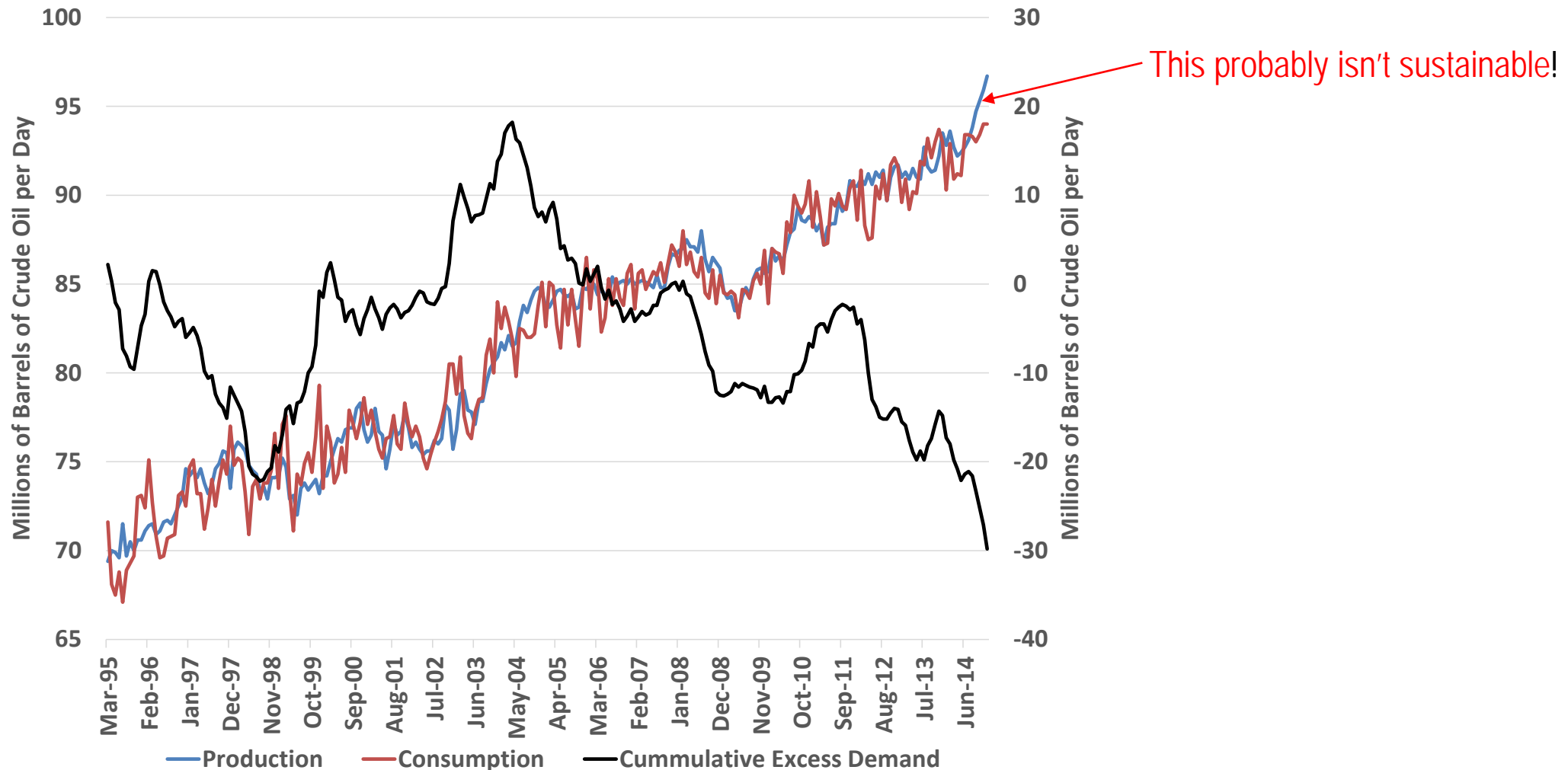
## US OIL AND NATURAL GAS PRODUCTION



# Global oil production growing faster than consumption

Since 2008 global oil production has outpaced consumption, with a cumulative 30 million barrels per day inventory surplus. Since July 2014 production has grown dramatically faster than consumption.

WORLD OIL PRODUCTION AND CONSUMPTION: 1995 - 2014

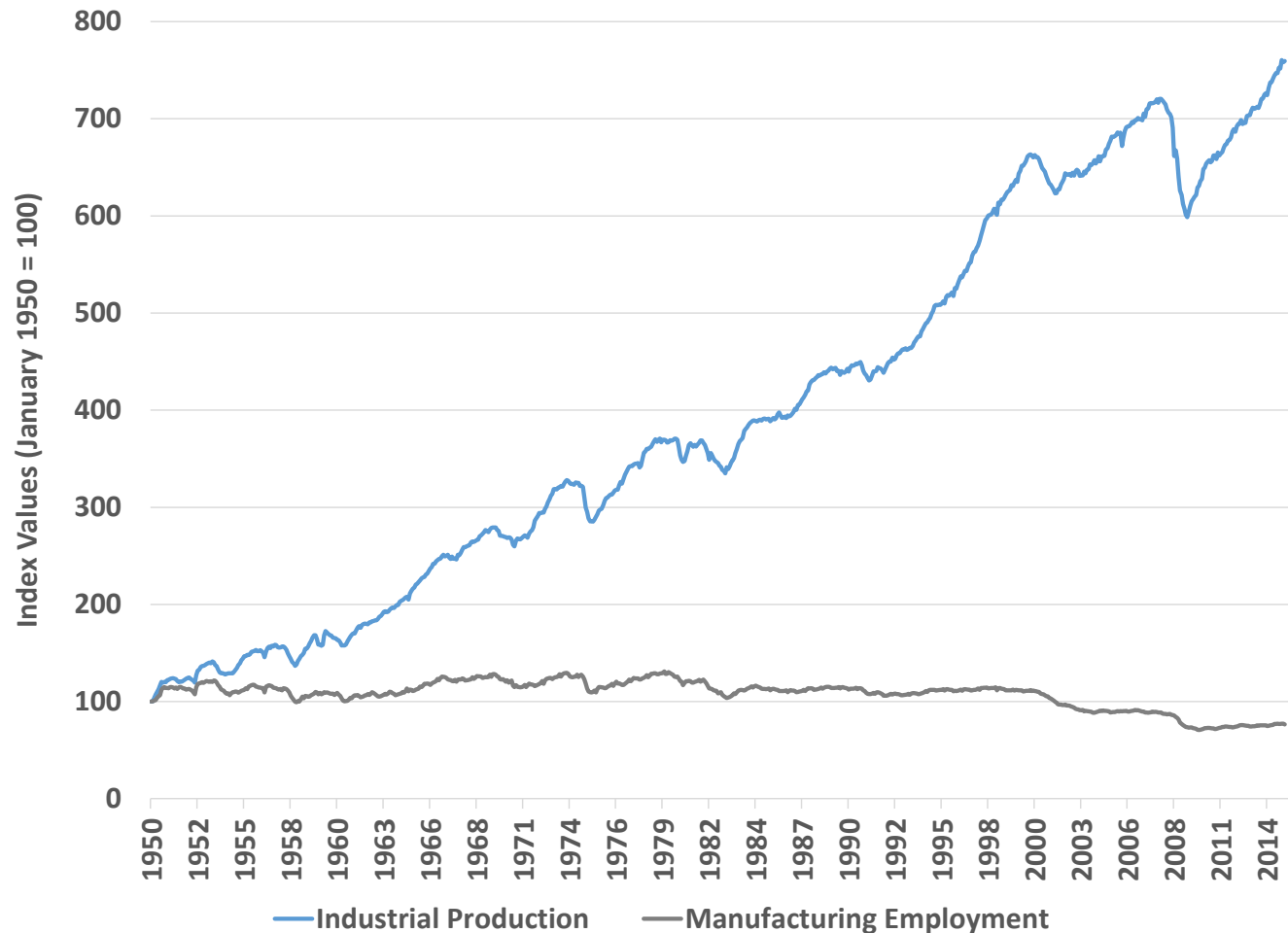




# US manufacturing is growing but not hiring

US manufacturing output is almost 8x the level of 1950 while employment is 25% lower. This is due to the changing nature of the commodities manufactured in the US (higher technology content) and automation. Using a minimum of relatively expensive US labor allows capital goods to be cost competitive.

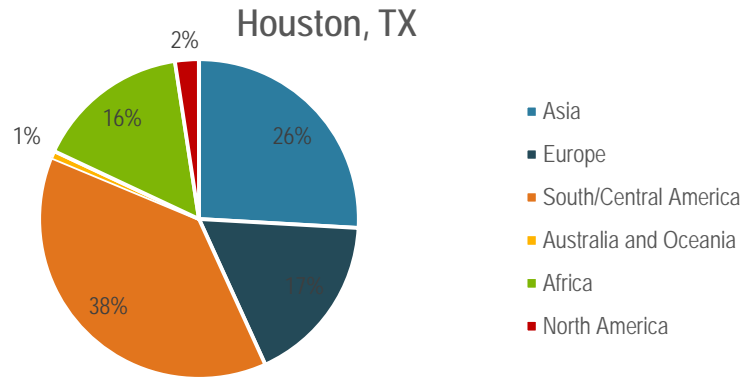
US MANUFACTURING AND EMPLOYMENT INDEXES: 1950 - 2014



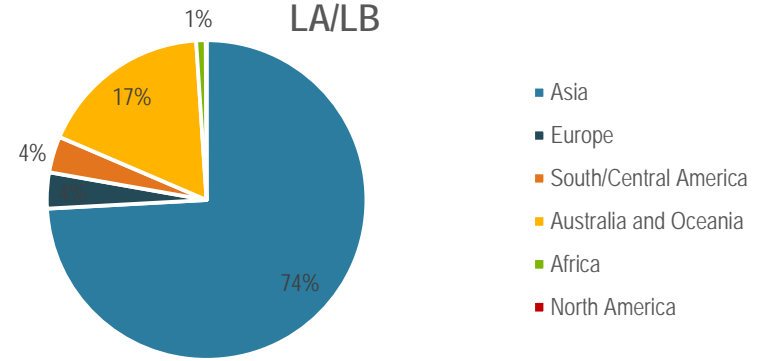




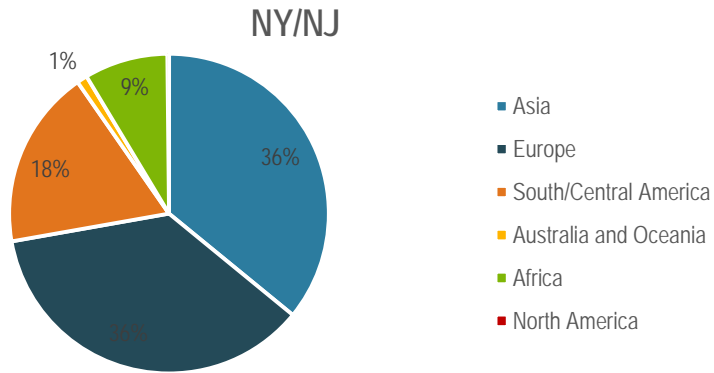
# Capital goods export destinations for a sample of ports



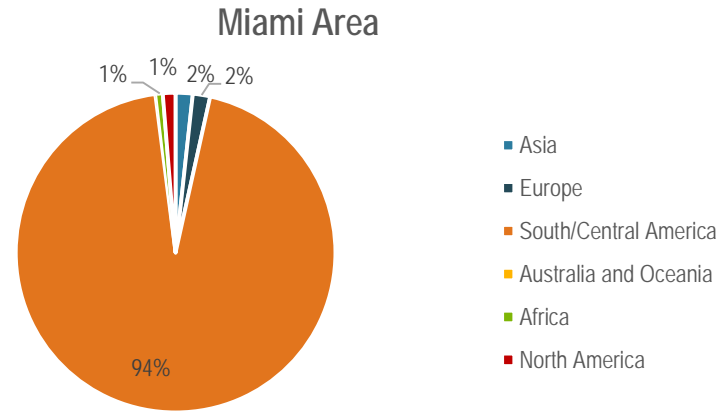
1.4M tons  
39% container  
61% bulk



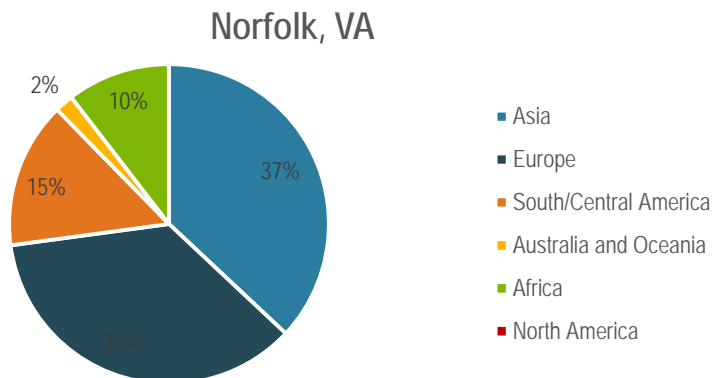
1M tons  
80% container  
20% bulk



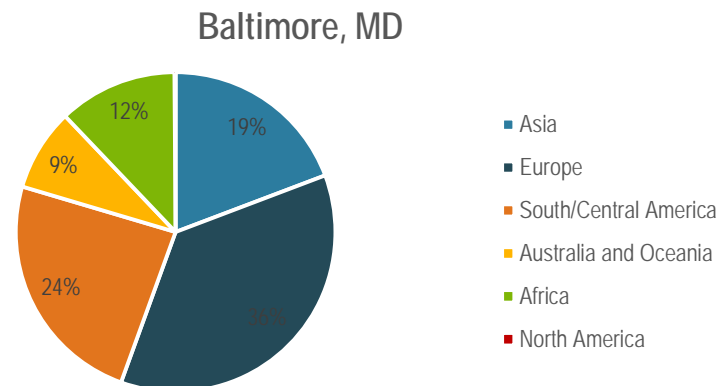
770,000 tons  
72% container  
28% bulk



650,000 tons  
61% container  
39% bulk



600,000 tons  
70% container  
30% bulk

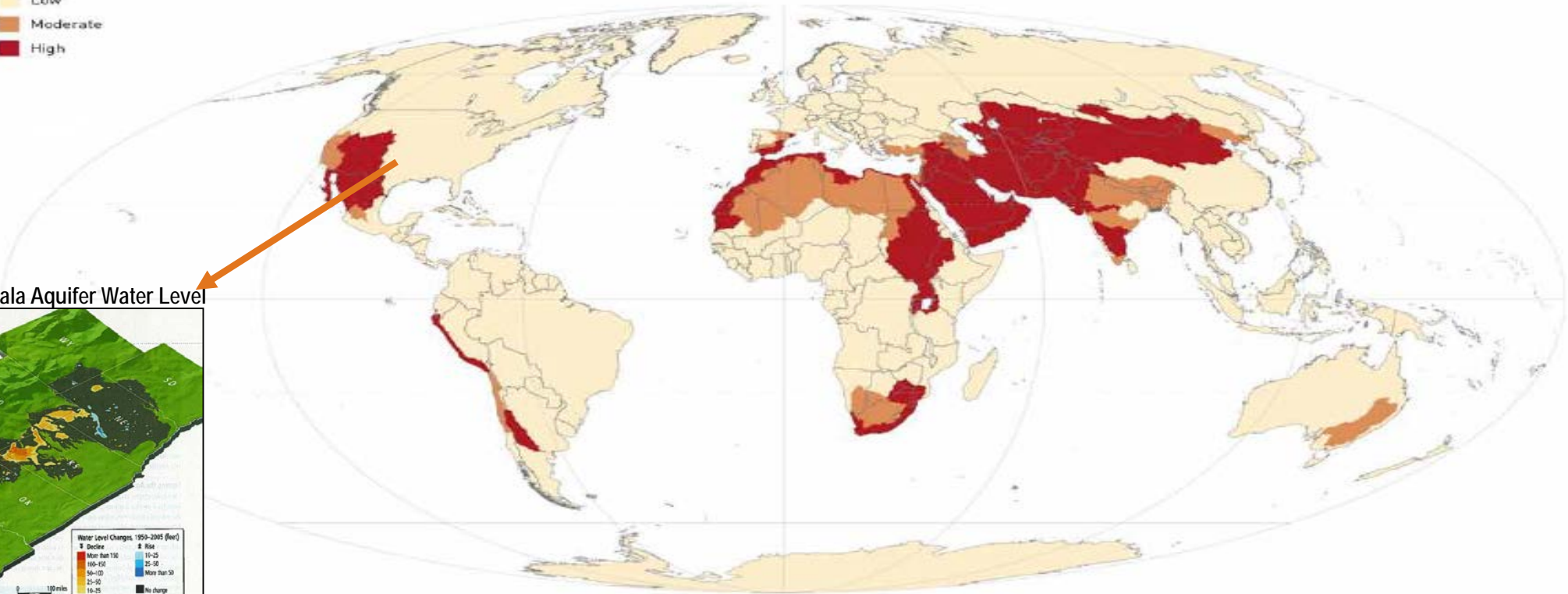


300,000 tons  
41% container  
59% bulk

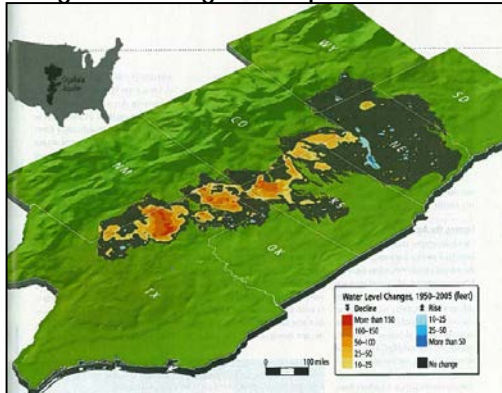
# Water is the overlooked looming resource crisis

Water is becoming increasingly scarce in Asia, the Middle East and in the Western half of the US. The Americas otherwise have abundant water and are likely to grow in importance as the world's breadbasket.

## GLOBAL DISTRIBUTION OF PHYSICAL WATER SCARCITY



Changes In The Ogallala Aquifer Water Level

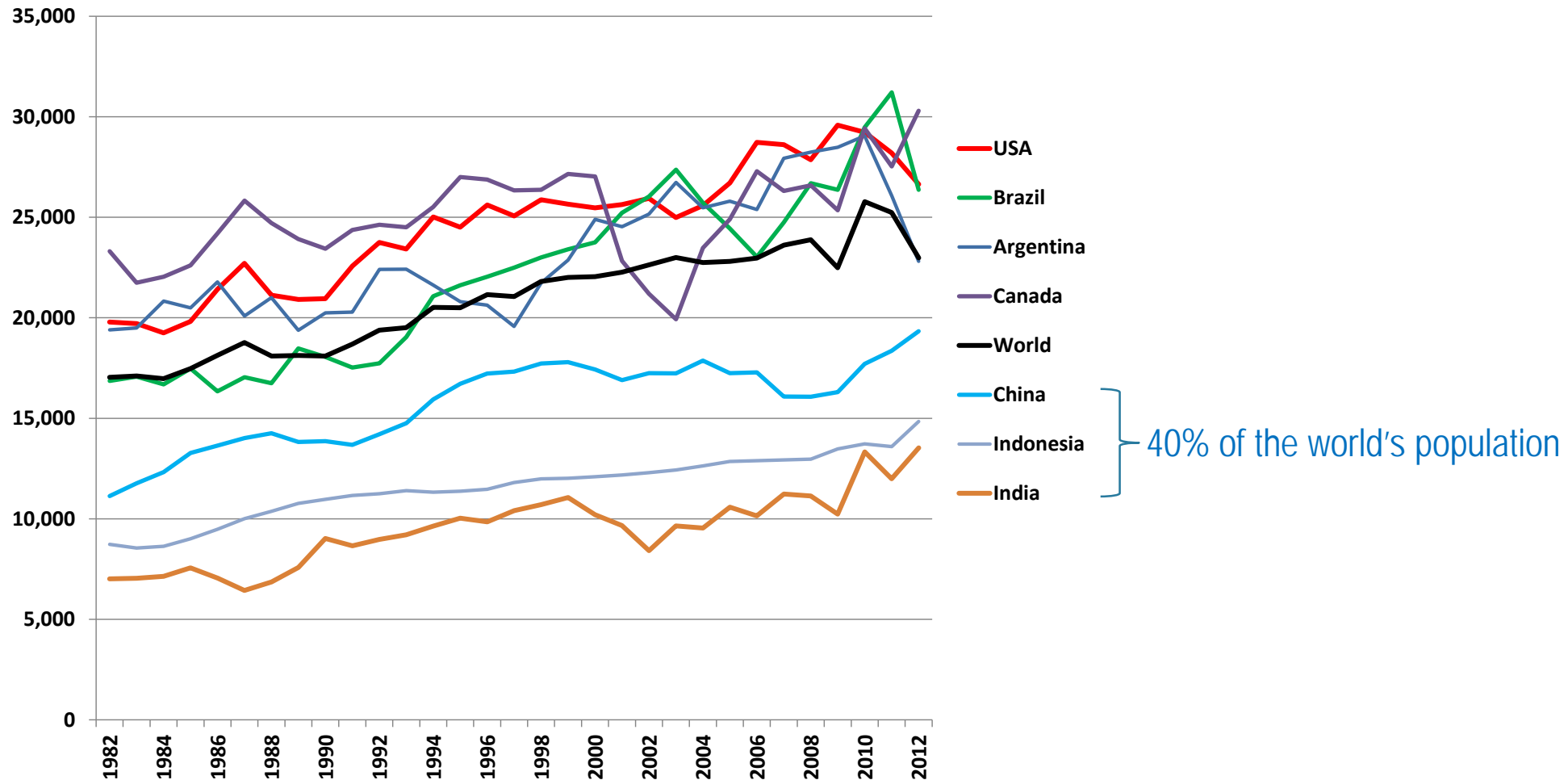




# Global soybean trends

Productivity is higher in the Americas because of larger farm sizes, technology (including mechanization and *automation*) and inland infrastructure – particularly storage, as well resources such as water.

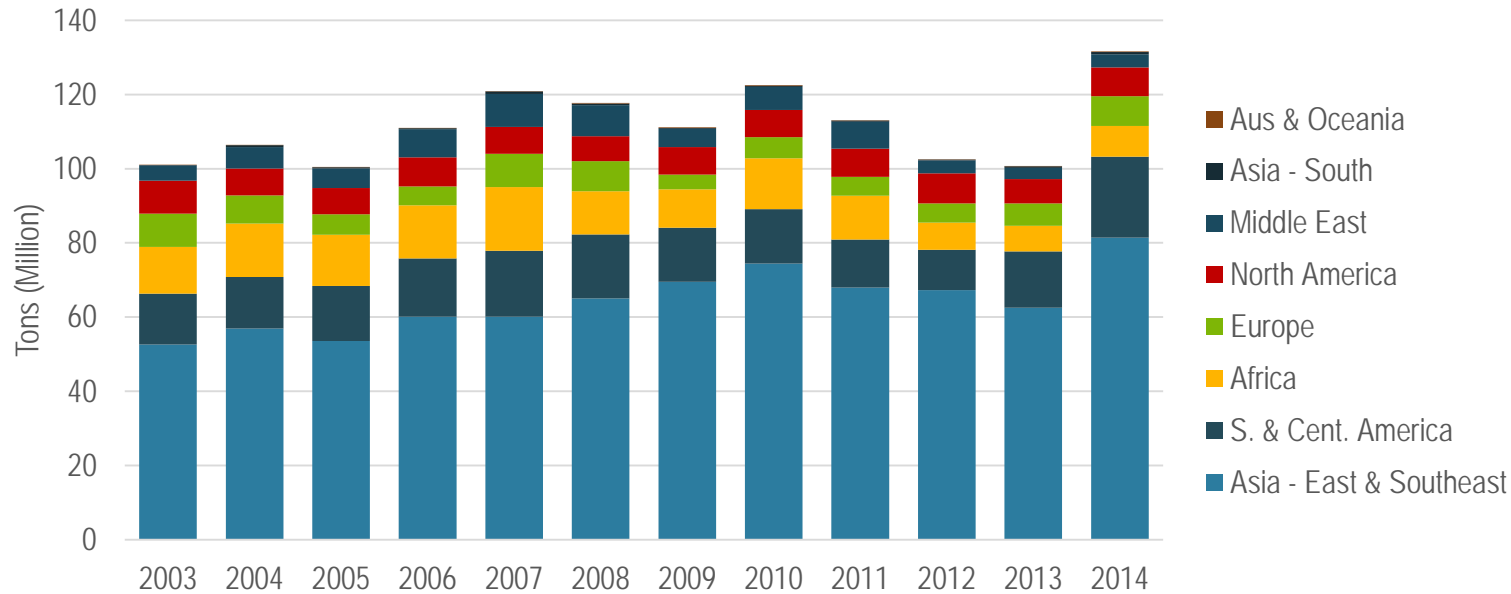
SOY YIELDS (HECTOGRAMS PER HECTARE) IN MAJOR PRODUCING AND CONSUMING NATIONS: 1982 - 2012





# Asia is the dominant destination of US grain and oilseed exports

US GRAIN AND OILSEED EXPORTS (MILLION METRIC TONS) BY DESTINATION

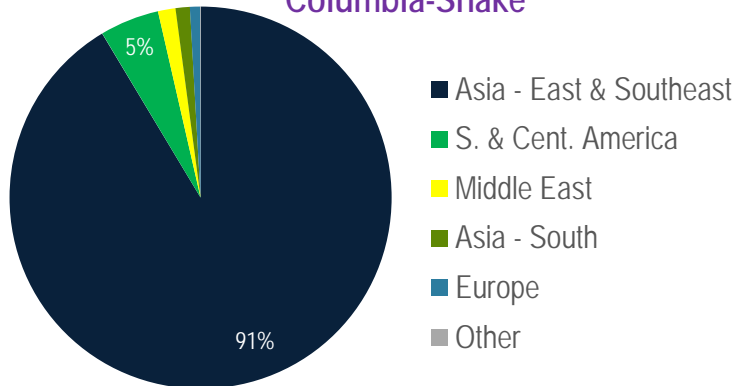


	2003	2005	2007	2009	2011	2013	2014	+/- Share
Asia - East & Southeast	52%	53%	50%	63%	60%	62%	62%	10%
China	11%	10%	10%	21%	21%	34%	30%	19%
S. & Cent. America	14%	15%	15%	13%	11%	15%	17%	3%
Africa	13%	14%	14%	9%	11%	7%	6%	-6%
Europe	9%	5%	7%	4%	4%	6%	6%	-3%
North America	9%	7%	6%	7%	7%	7%	6%	-3%
Middle East	4%	5%	7%	4%	6%	3%	3%	-1%
Asia - South	0%	0%	1%	0%	0%	0%	0%	0%
Aus & Oceania	0%	0%	0%	0%	0%	0%	0%	0%
	100%	100%	100%	100%	100%	100%	100%	



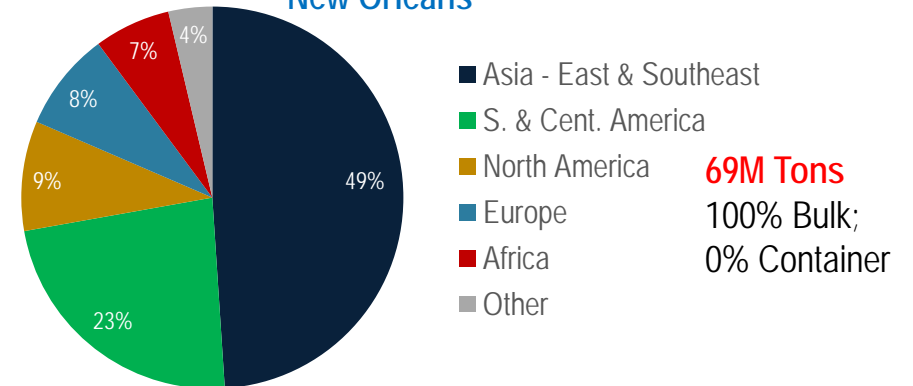
# East coast grain and oilseeds export destinations are more diversified

### Columbia-Snake



**25M Tons**  
99% Bulk;  
1% Container

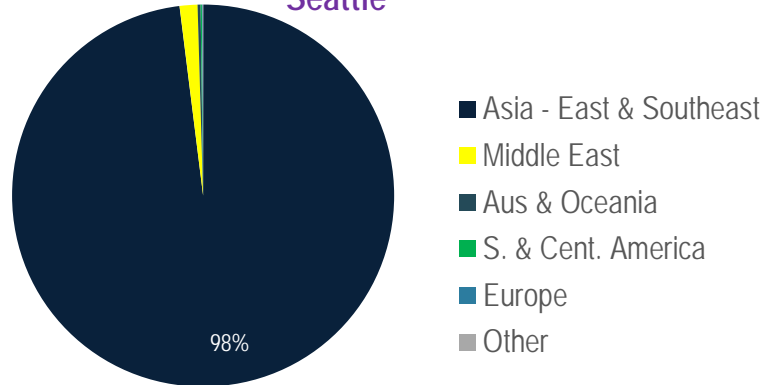
### New Orleans



**69M Tons**  
100% Bulk;  
0% Container

WEST COAST

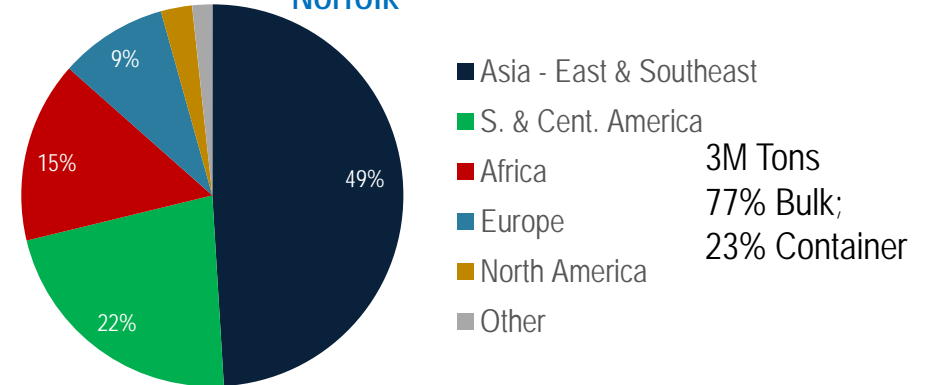
### Seattle



**11M Tons**  
83% Bulk;  
17% Container

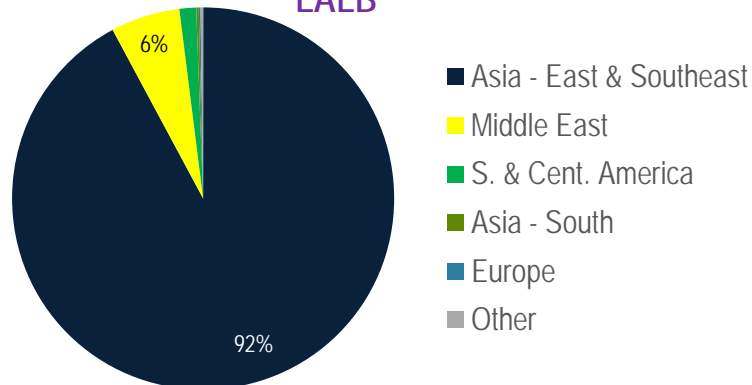
EAST COAST

### Norfolk



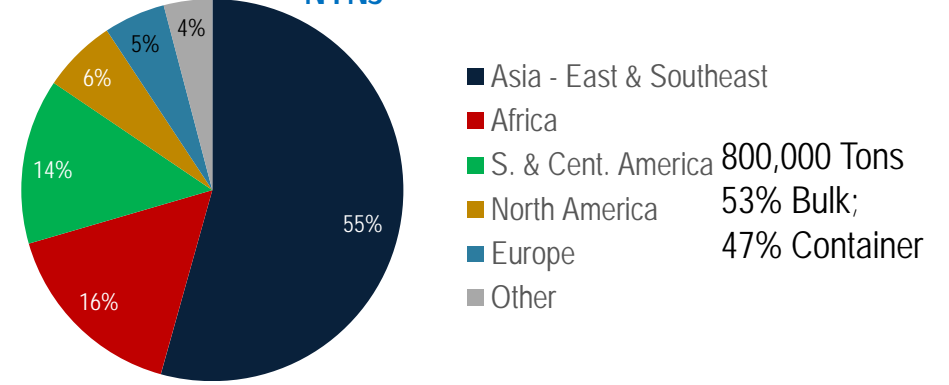
**3M Tons**  
77% Bulk;  
23% Container

### LALB



**4M Tons**  
24% Bulk;  
76% Container

### NYNJ



**800,000 Tons**  
53% Bulk;  
47% Container



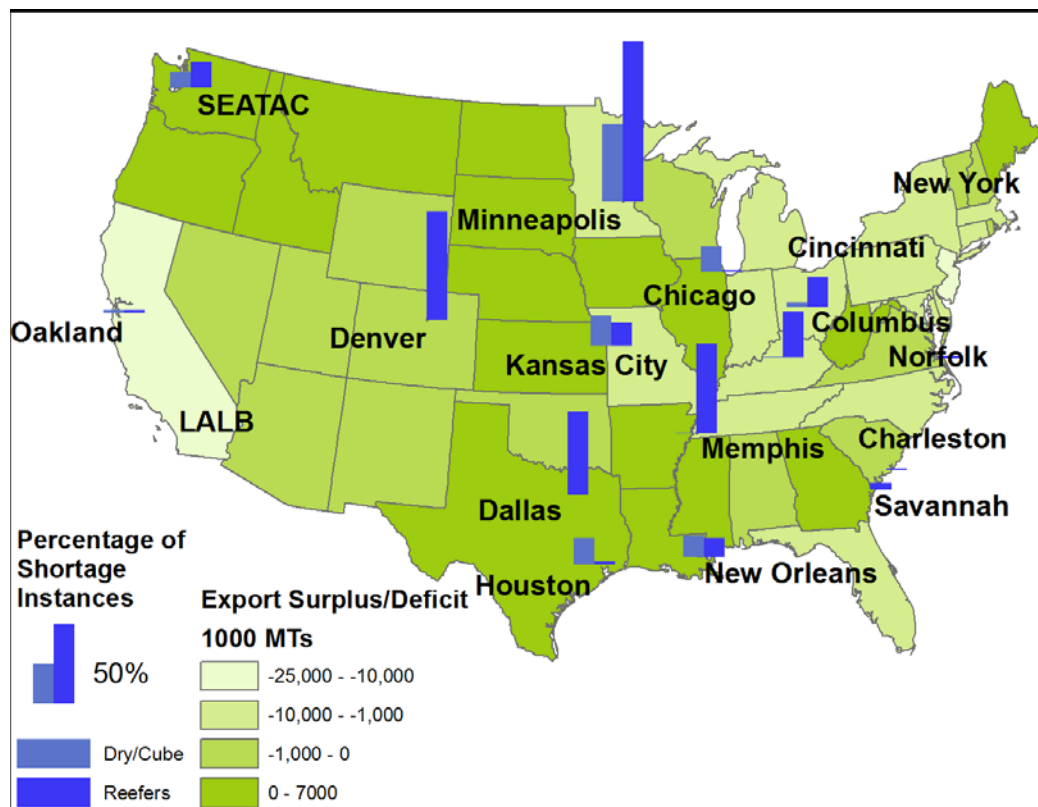




# Empty container availability is very poor in the less urban areas

Exporters in areas of the Midwest that are not very urban have the least amounts of containers available. This hampers agricultural exports that are best suited for containerization.

## CONTAINER SHORTAGE INCIDENCE BY CITY



## CONTAINER SHORTAGE INCIDENCE BY TYPE (FEB 2014 – FEB 2015)

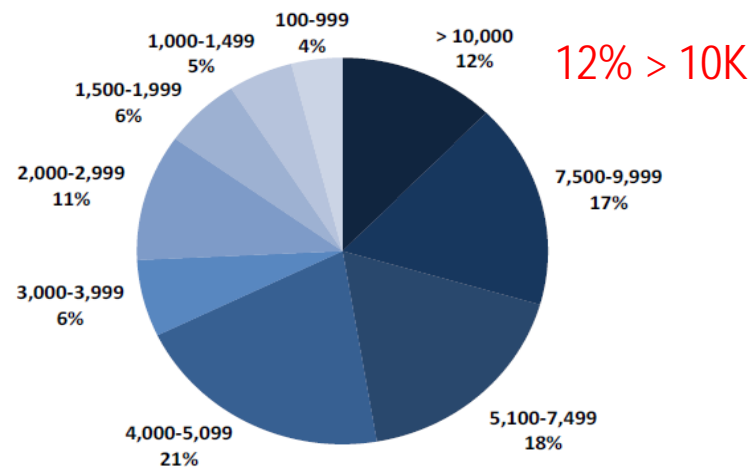
		Dry				Reefer		
		20ft	40ft	40ft High	Average	40ft	20ft	Average
East	New York	0%	0%	0%	0%	0%	0%	0%
	Norfolk	0%	0%	0%	0%	0%	2%	1%
	Charleston	0%	0%	0%	0%	13%	0%	7%
North-Central	Savannah	0%	0%	0%	0%	8%	0%	4%
	Minneapolis	45%	68%	25%	46%	100%	100%	100%
	Chicago	0%	51%	13%	21%	2%	4%	3%
	Cincinnati	0%	0%	0%	0%	4%	49%	26%
	Columbus	0%	6%	0%	2%	8%	32%	20%
South Central	Kansas City	2%	51%	4%	19%	0%	42%	21%
	Memphis	0%	2%	0%	1%	13%	100%	57%
	New Orleans	11%	15%	19%	15%	11%	28%	20%
	Dallas	0%	0%	0%	0%	2%	98%	50%
	Houston	26%	49%	2%	26%	0%	8%	4%
West	Denver	0%	0%	0%	0%	55%	70%	62%
	LALB	0%	0%	0%	0%	0%	0%	0%
	Oakland	9%	0%	0%	3%	8%	4%	6%
	Seattle	4%	0%	21%	8%	0%	8%	4%
	Tacoma	0%	11%	25%	12%	51%	2%	26%
Average		5%	14%	6%	8%	15%	30%	23%



# More freight on fewer vessels

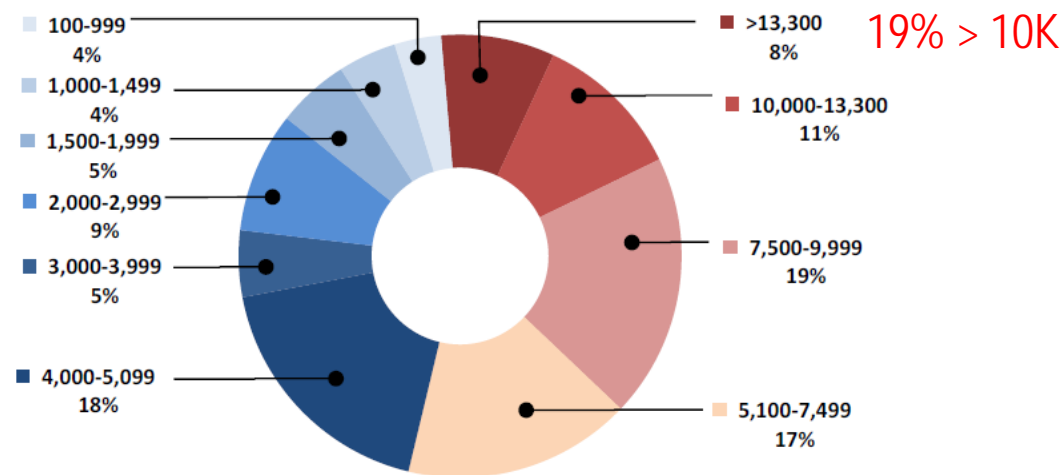
As at 1 November 2012

Fleet Capacity Breakdown by TEU size range



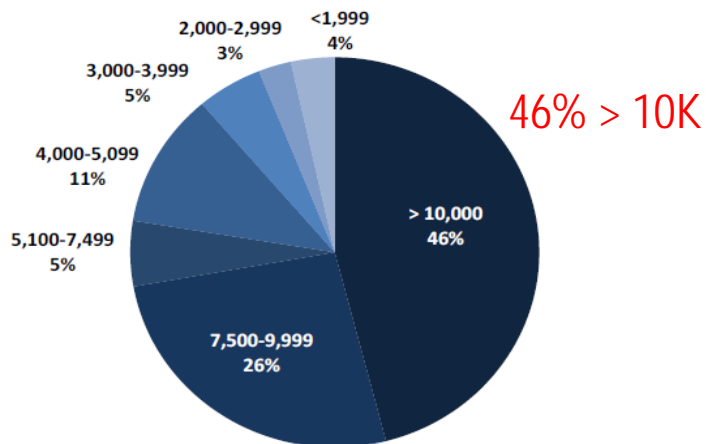
As at 1 February 2015

Fleet Capacity Breakdown by TEU size range



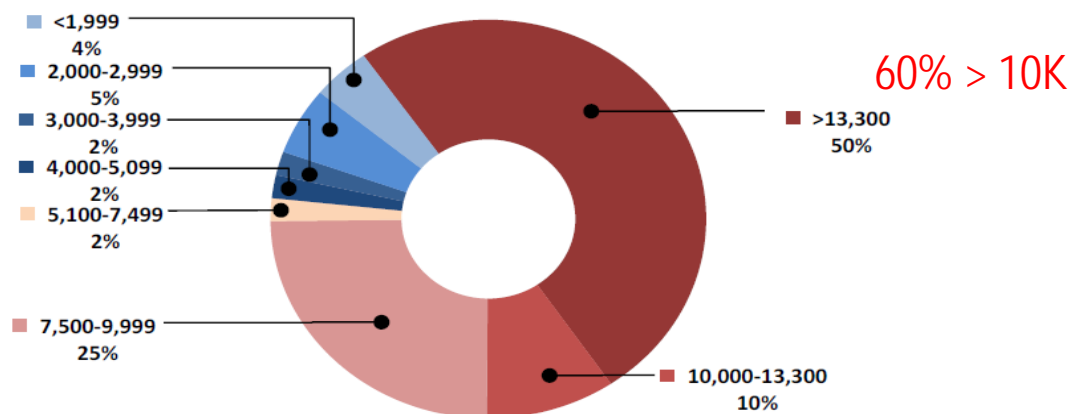
As at 1 November 2012

Orderbook Capacity Breakdown by TEU size range



As at 1 February 2015

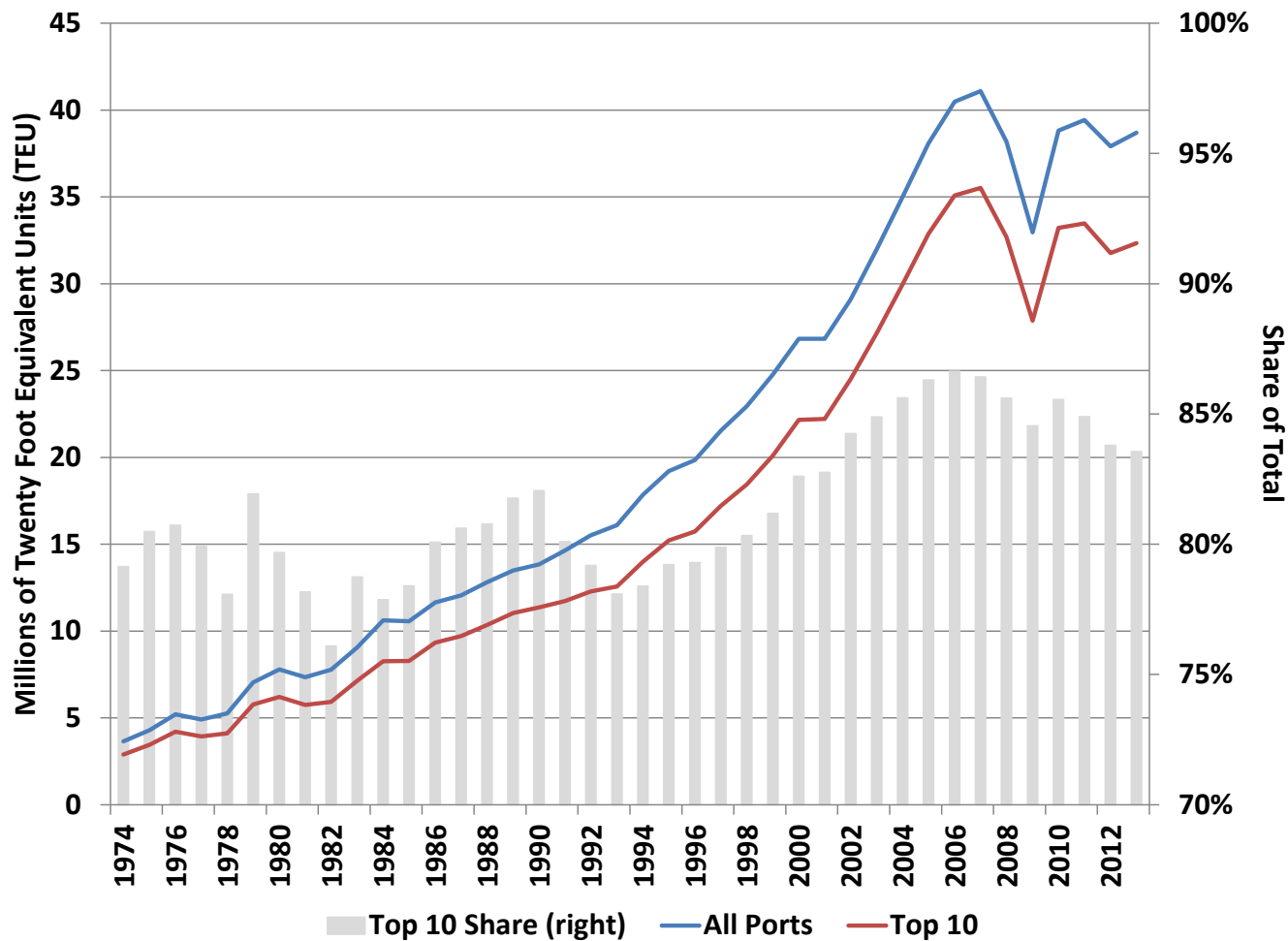
Orderbook Fleet Capacity Breakdown by TEU size range



# More freight in fewer gateways

As volumes concentrate in fewer ships to reduce average fixed costs per slot, they concentrate in fewer ports.

US INTERNATIONAL CONTAINER VOLUMES AND PORT SHARES: 1974 - 2013



Source: AAPA, Moffatt & Nichol

# Congestion is a global problem that needs local solutions

TRUCK TRAFFIC IN ROTTERDAM



PORT TRAFFIC IN SOUTHERN CALIFORNIA



TRUCK LINES AT THE PORT OF PARANAGUA, BRAZIL



PORT OF SHANGHAI, CHINA



# Brazil is becoming a more competitive supplier

The US can benefit from agricultural exports, if it can get products to the market, but its competitors are gaining. Brazilian exports are likely to benefit from the Panama Canal expansion. **Press reports indicate Brazil soy exports freight costs to China could decline 34%** and have a \$180 per ton advantage from the Cerrado to Shanghai over Davenport to Shanghai.

## COSTS OF TRANSPORTING SOYBEANS\*

	Davenport to Shanghai	Sioux Falls to Shanghai	N. Mato Grosso to Shanghai
Truck	\$13.51	\$13.51	\$109.73
Barge	\$24.86		
Rail		\$55.66	
Ocean	\$46.82	\$23.88	\$32.00
Total Transportation	\$85.19	\$93.05	\$141.73
Farm Value	\$565.85	\$552.38	\$570.66
Customer Cost	\$651.04	\$645.43	\$712.39

\*U.S. vs. Brazil. Price per metric ton in 2012 – Q3

Source: U.S. Department of Agriculture, Agronegocios



## Takeaways

- **Freight transportation congestion is a global problem that will worsen in 2015 and 2016 due to imbalances in infrastructure investment.**
- **Global economic outlook depends on emerging market consumers replacing aging developed economy consumers, which requires significant infrastructure investment.**
- **Some combination of transportation and water infrastructure investment is required to realize potential growth.**



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