

Trading Patterns — Successfully Dealing With Change



AAPA
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Moffatt & Nichol Economics Group

- ENR Top 100 company, founded in 1945 in Long Beach, California
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 - 6 Practices: Goods Movement, Energy, Ports, Coastal, Urban Waterfronts & Marinas, Inspection & Rehabilitation
- M&N combines the expertise of technical and commercial specialists gained over 65 years of planning and engineering experience on over 8,000 projects:
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 - Economic analyses of investment/privatization
 - Strategic development plans
 - Port selection/network analysis
 - Coastal engineering
 - Port and waterside construction (marinas)
 - Terminal design for all types of freight and passenger movement
 - Railroads and capacity expansion
 - Environmental issues/emission modeling



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Harbor and Coastal Engineering Award

1. **Outline/Executive Summary**
2. **Macro Trends**
3. **Changing World**
4. **Structural Change**
5. **Conclusions**




U.S. Department of Transportation
Federal Highway Administration


U.S. Department of Transportation
Bureau of Transportation Statistics

- 1. Ports serve the economy**
 - volumes and their composition reflect economic trends

- 2. Ports have to adapt**
 - the World and US economies are changing

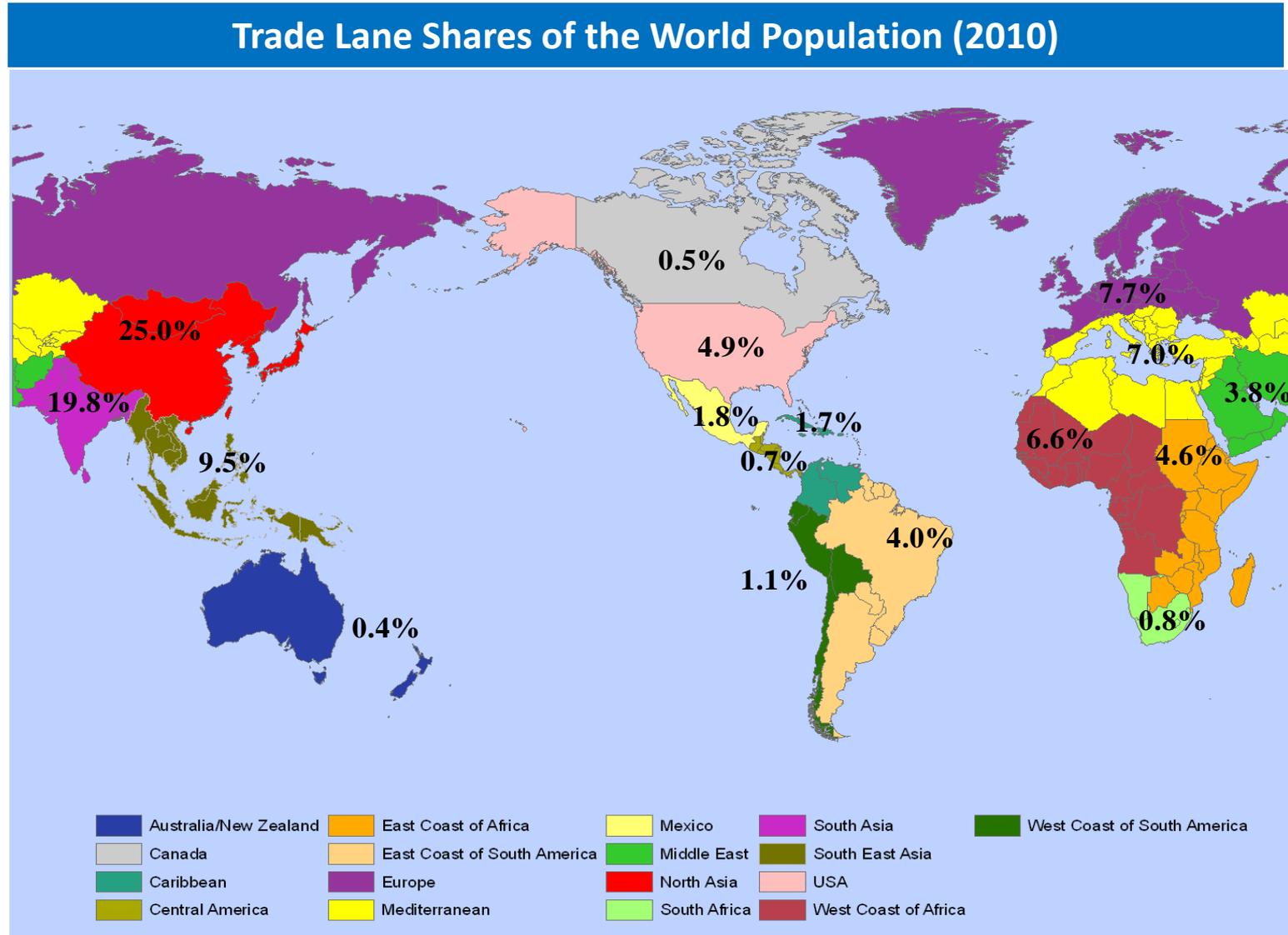
- 3. Ports have to understand their changing roles and invest accordingly**
 - all the structural drivers (technology, public policy, infrastructure and the environment) are changing

Outline

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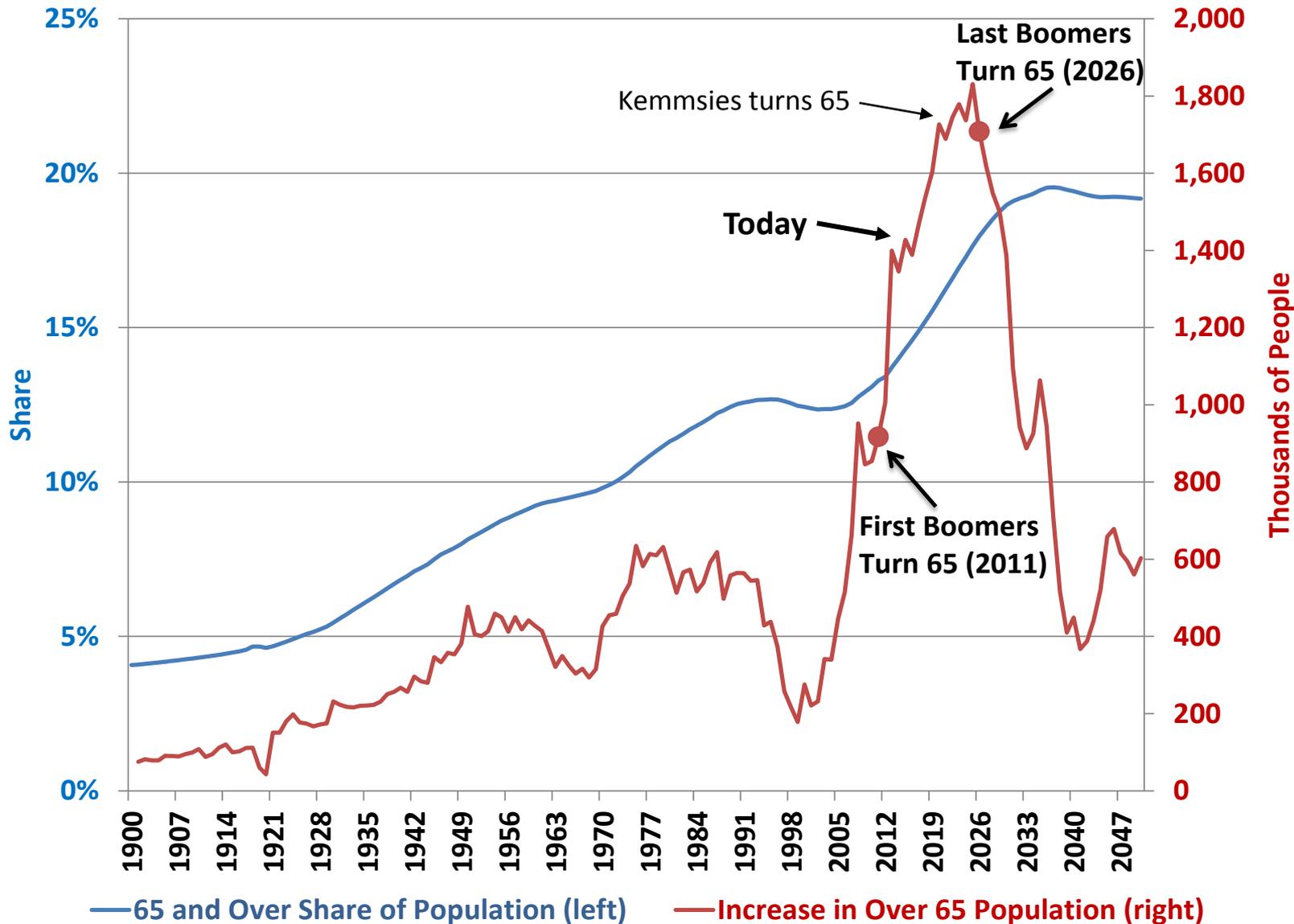
Asia accounts for over half of the world's population

Asia has the largest share of the world population. Europe and the Med the second largest. It is no surprise that Asia-Europe/Med trade is the largest trade lane by volume and deployed vessel capacity.



Source: International Monetary Fund, Moffatt & Nichol

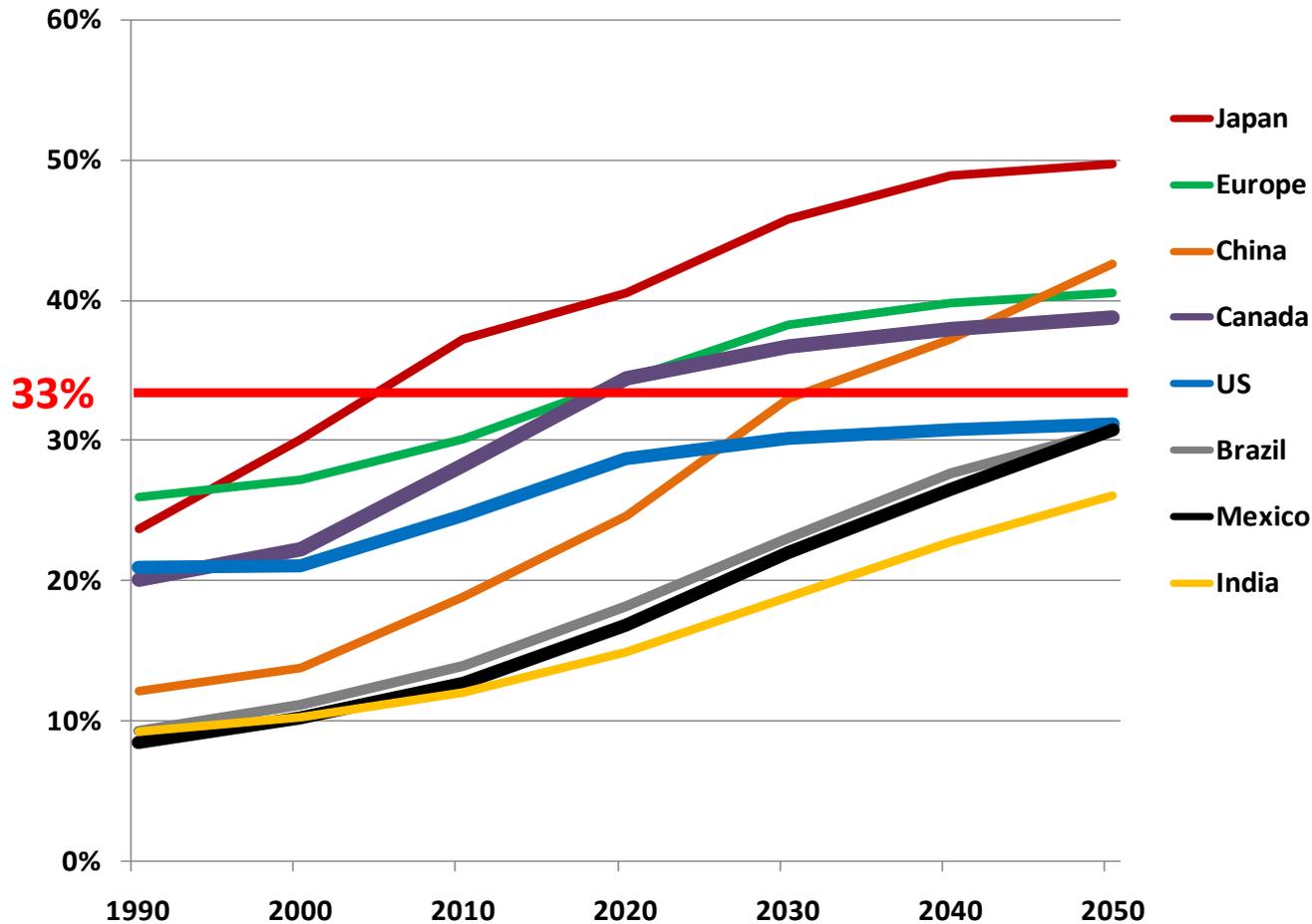
People Turning 65 and Their Share of the Population: 1900 - 2050



The world is aging

Economic growth is driven by population and output per capita growth. **Countries with younger populations grow faster than countries with older populations. Younger people spend more of their money on goods than on services.** UN demographic projections indicate Africa, India and LatAm have a younger population than most regions and are projected to remain the “youngest” for many decades.

Percentage of the Population Below 55 Years of Age

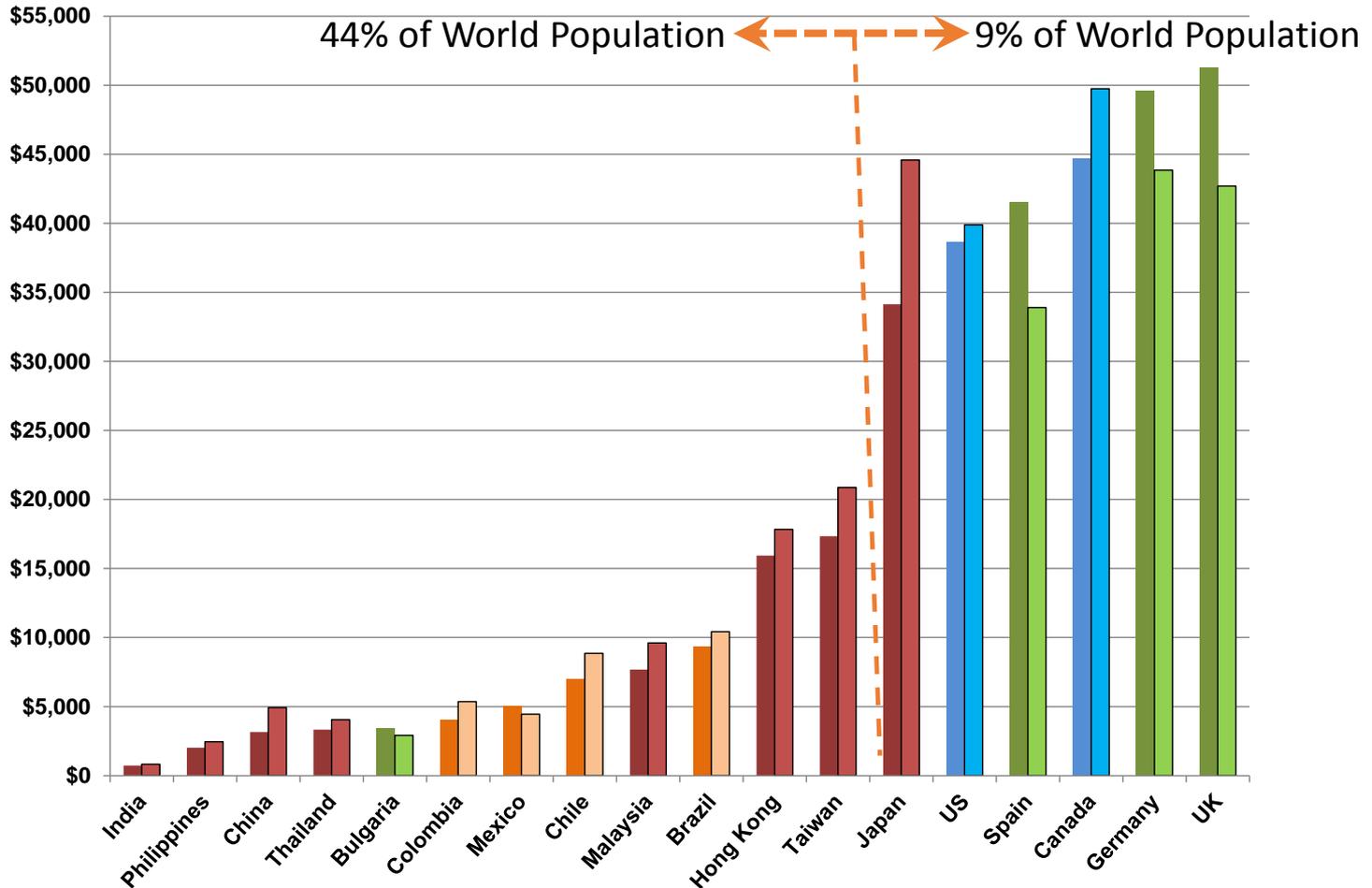


Source: International Monetary Fund, Moffatt & Nichol

Low but rising wages drove outsourcing to emerging markets

It is unlikely that manufactured goods which are *labor intensive* will be manufactured in the US. Besides lower production costs, emerging markets also have faster growing demand for manufactured goods. It is not surprising that many factories moved from N America, Europe and Developed Asia to China and other Emerging Asian economies.

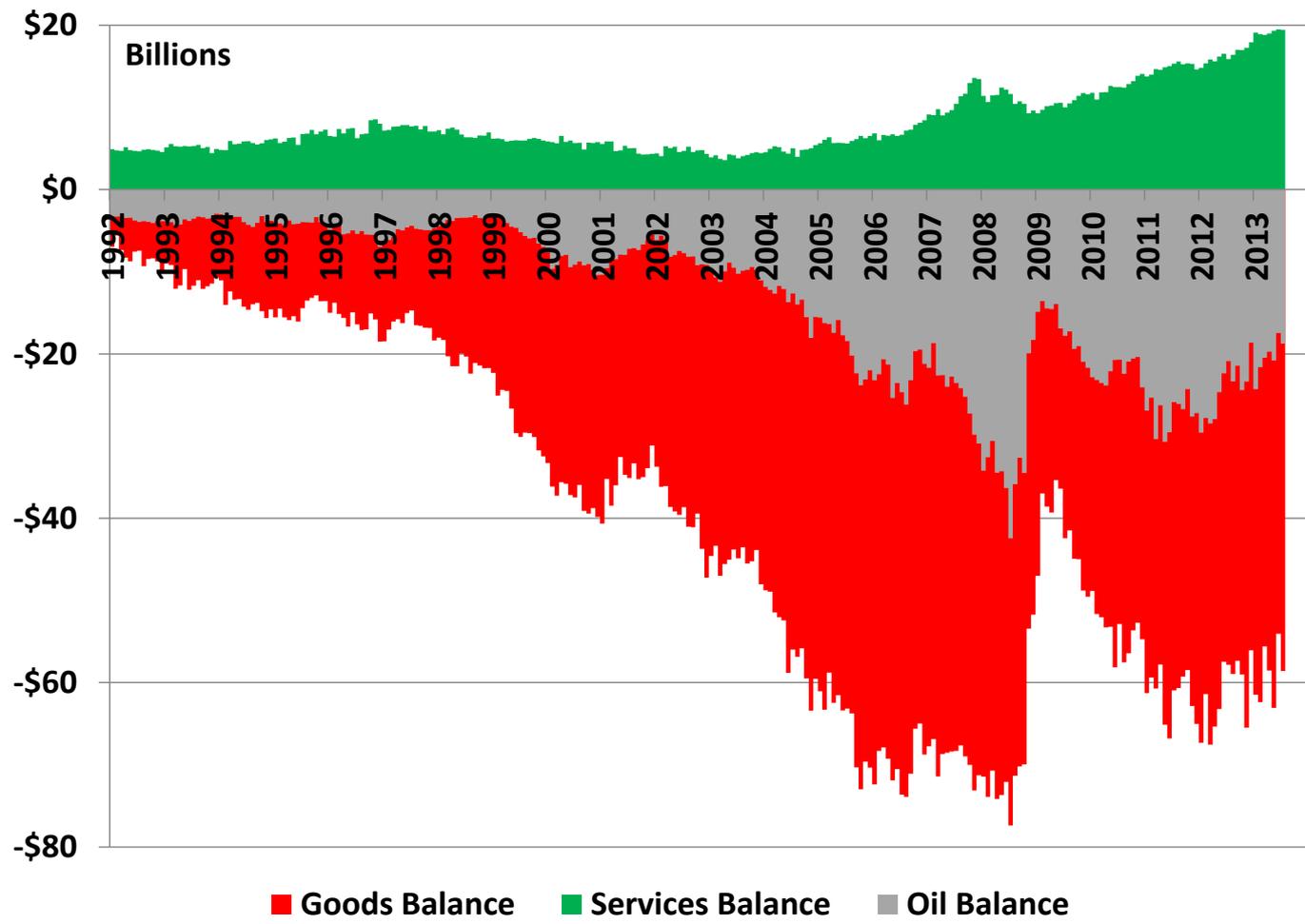
Manufacturing Wage Comparisons in US\$ in 2008 and 2012E



The trade deficit has become unsustainable

The US trade deficit ballooned as since China joined the World Trade Organization. Due to fracking, US oil production is growing and further investment in infrastructure to move this oil will help reverse the oil trade deficit (shown in gray). Excluding oil, the goods trade deficit is still 2x that of the services surplus. The US needs to export more or down the road it will stagnate.

US Trade Balance Components: 1992 -2012

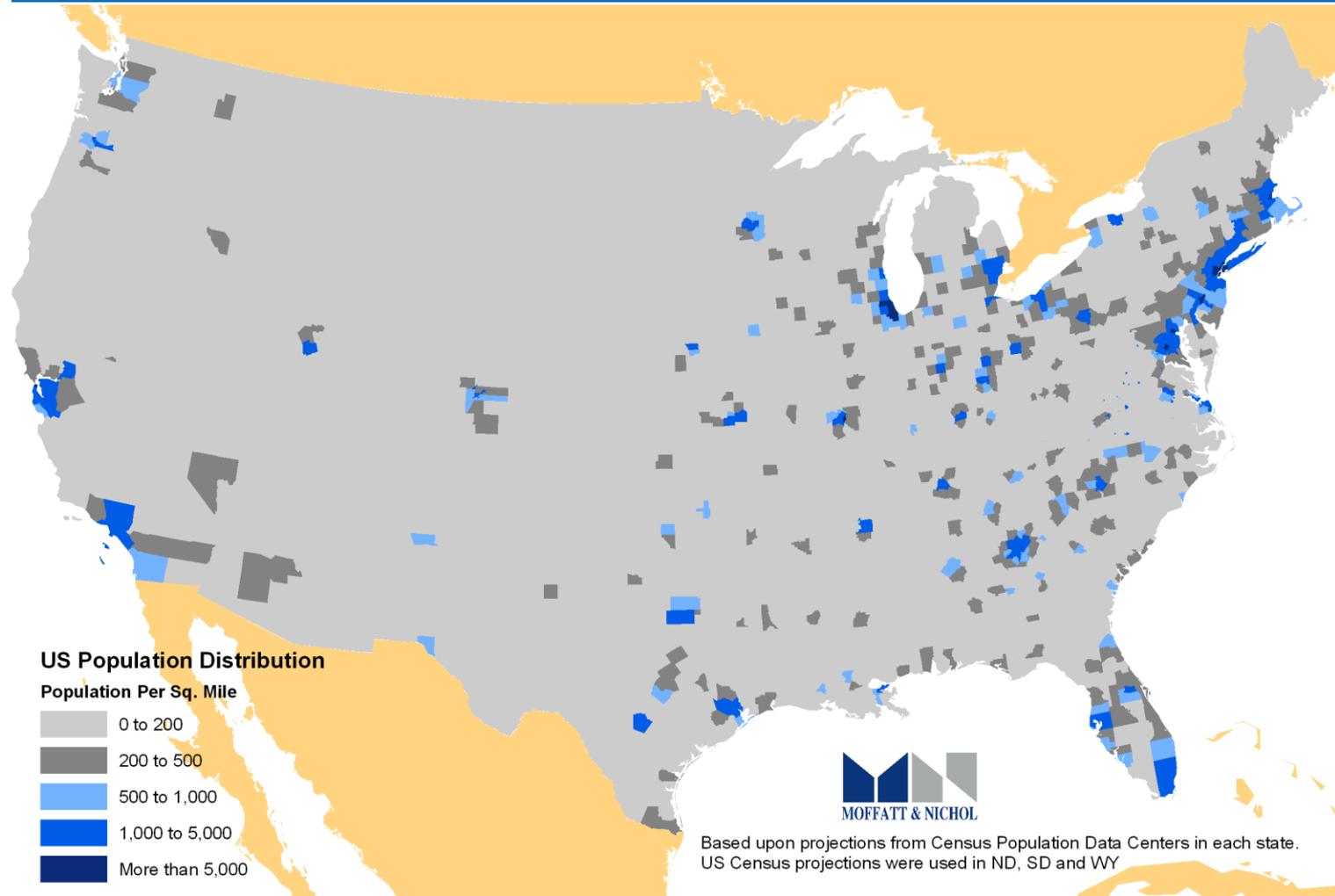


32% of the trade deficit is due to oil

Imported goods end up in population centers

. It is no surprise that Southern California and NY are the largest ports in the US. About 25% of US GDP is generated within 200 miles of New York City. Except for the Tampa-Orlando and Houston-Dallas-San Antonio regions, the Gulf Coast is sparsely populated

Distribution of US Population Density

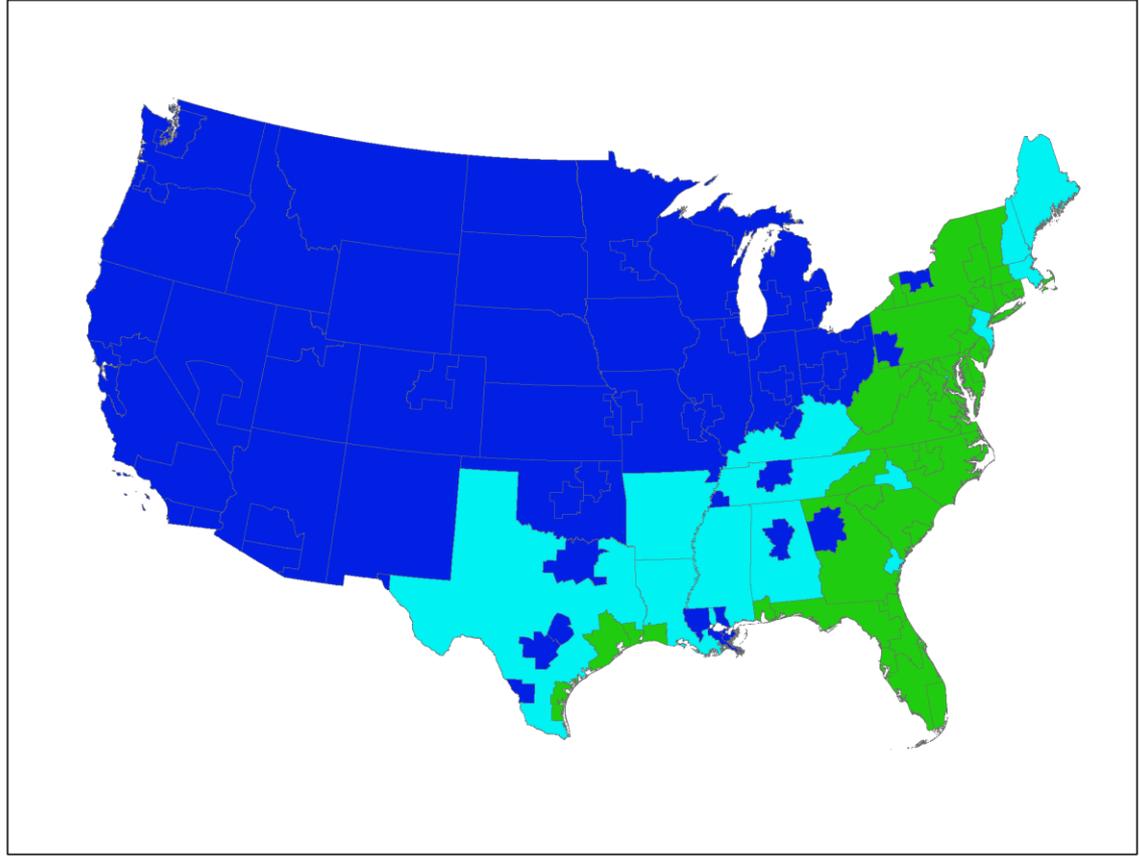


Source: International Monetary Fund, Moffatt & Nichol

Battleground for North Asia container imports is in the South

The Freight Analysis Framework database shows the economic zones that are dominated by West and Gulf/East Coast ports, and where neither has a dominant share. Since the Panama Canal will be constrained to 13,000 TEU vessels and the Suez Canal does not limit the size of vessel that can transit it, the West Coast will have to be able to handle the largest size vessel possible, currently 18,000 TEUs in order to compete for Asia-East US.

West Coast versus East/Gulf Coast Shares of Container Imports from Asia



Port container volumes



US can competitively export Ag, Capital Goods and Energy

Labor is more expensive and capital is cheaper in the US compared to fast growing 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.

Top 10 High Potential US Net Exports¹

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

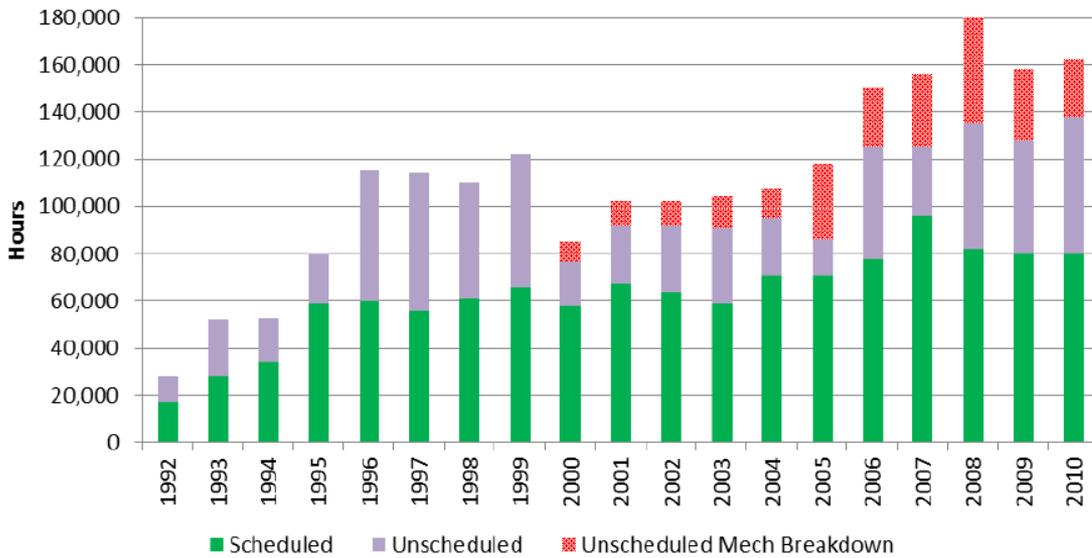
Bulk/Breakbulk	Score
Oil Seeds (Soy)	32.7
Meat and Other Edible Animal Parts	28.7
Cereal Grains	3.9
Animal Feed	3.4
Wood And Charcoal	0.4
Crude Oil and Refined Petroleum/Natural Gas Products	0.4
Live Animals	0.3
Wood Pulp Scrap and Waste	0.2
Fish and Crustaceans	0.2
Dairy Products, including Eggs and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

1 Based on relative comparative advantage as defined by Bela Belassi

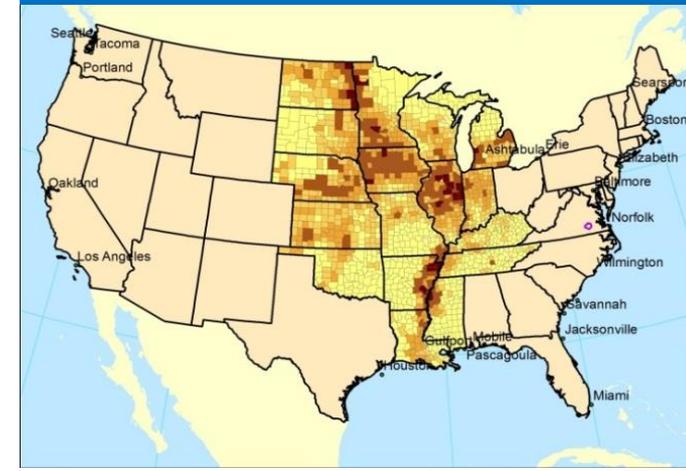
Deteriorating inland waterway infrastructure

54% of the Inland Marine Transportation System's (IMTS) structures are more than 50 years old and 36% are more than 70 years old. This has impacted where grain is produced and exported. Grain increasingly moves on steel rivers (railways). The outlook for US exports depends on railroads unless the US begins to invest more in inland waterways.

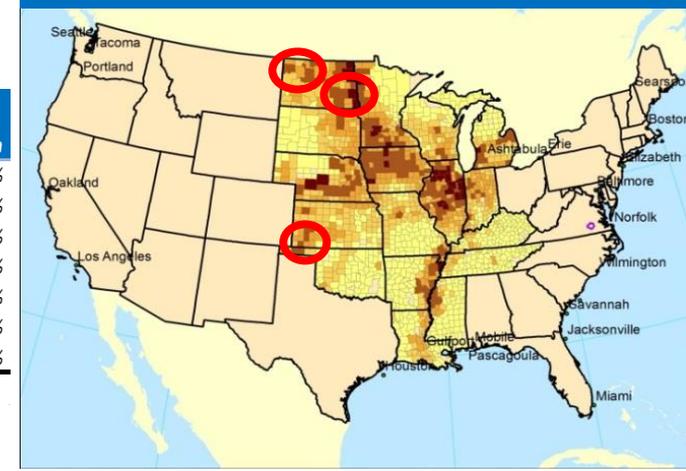
Hours of Lock Outages by Year and by Type of Outage



Grain and Oilseed Production in 1997



Grain and Oilseed Production in 2007



	Share of US Grain Exports											Gain
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013E	
Columbia-Snake	14%	17%	16%	14%	16%	18%	15%	17%	18%	20%	24%	10%
Los Angeles, CA	1%	1%	2%	2%	4%	4%	3%	3%	4%	4%	5%	3%
Minneapolis, MN	0%	0%	1%	1%	2%	1%	1%	2%	1%	1%	0%	0%
New Orleans, LA	60%	55%	51%	54%	49%	46%	51%	49%	47%	51%	46%	-14%
Norfolk, VA	1%	0%	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%
San Francisco, CA	1%	1%	1%	1%	1%	1%	2%	1%	2%	2%	2%	1%
Seattle, WA	8%	11%	13%	12%	11%	13%	12%	11%	12%	11%	10%	2%
Total US	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	

New Orleans District is losing share to West Coast ports

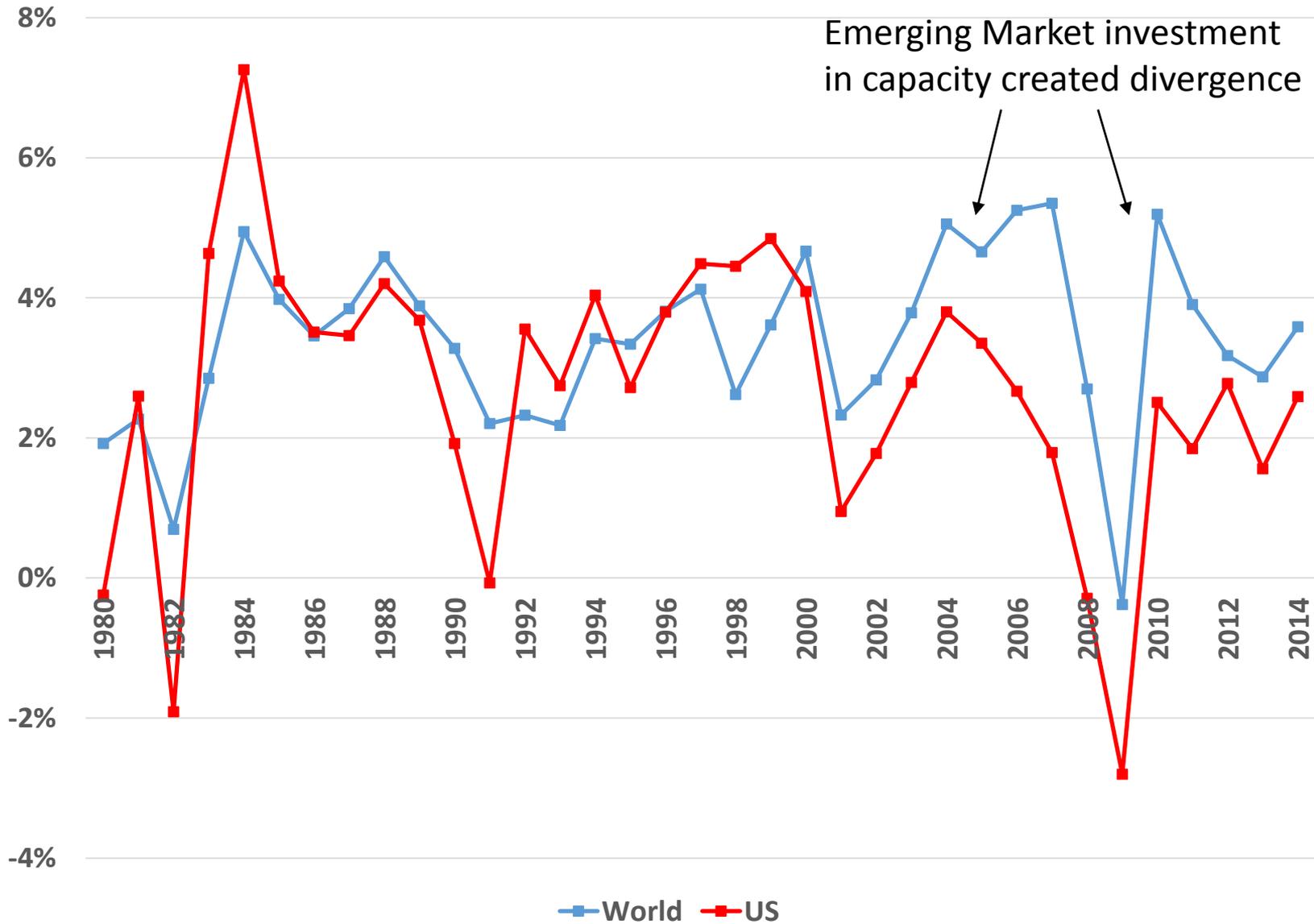
What does this mean for ports?

- Weak import demand and weak pricing power has intensified competition
- Strong Emerging Market demand for bulk is expected to continue as these economies continue to grow and develop
 - Grains and oilseeds
 - Meat
 - Biofuels – wood pellets
 - Capital Goods
 - Coal
 - Natural gas
 - Oil

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Global and US Inflation-adjusted (real) GDP Growth: 1980 – 2013E



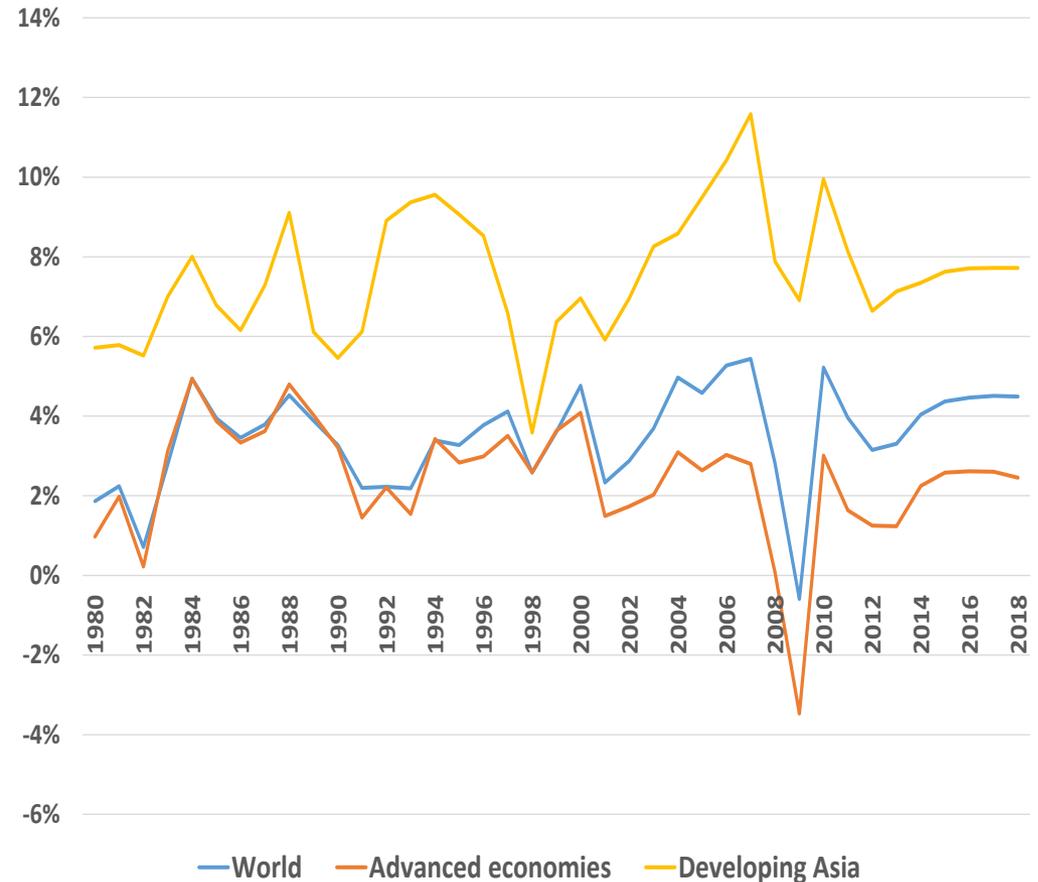
Emerging markets are the growth opportunity

Growing emerging market middle class consumers want the same things that their developed economy counterparts have, such as nutrition, . The US has to pursue exports in order to regain its footing.

GDP Based on Purchasing Power Parity

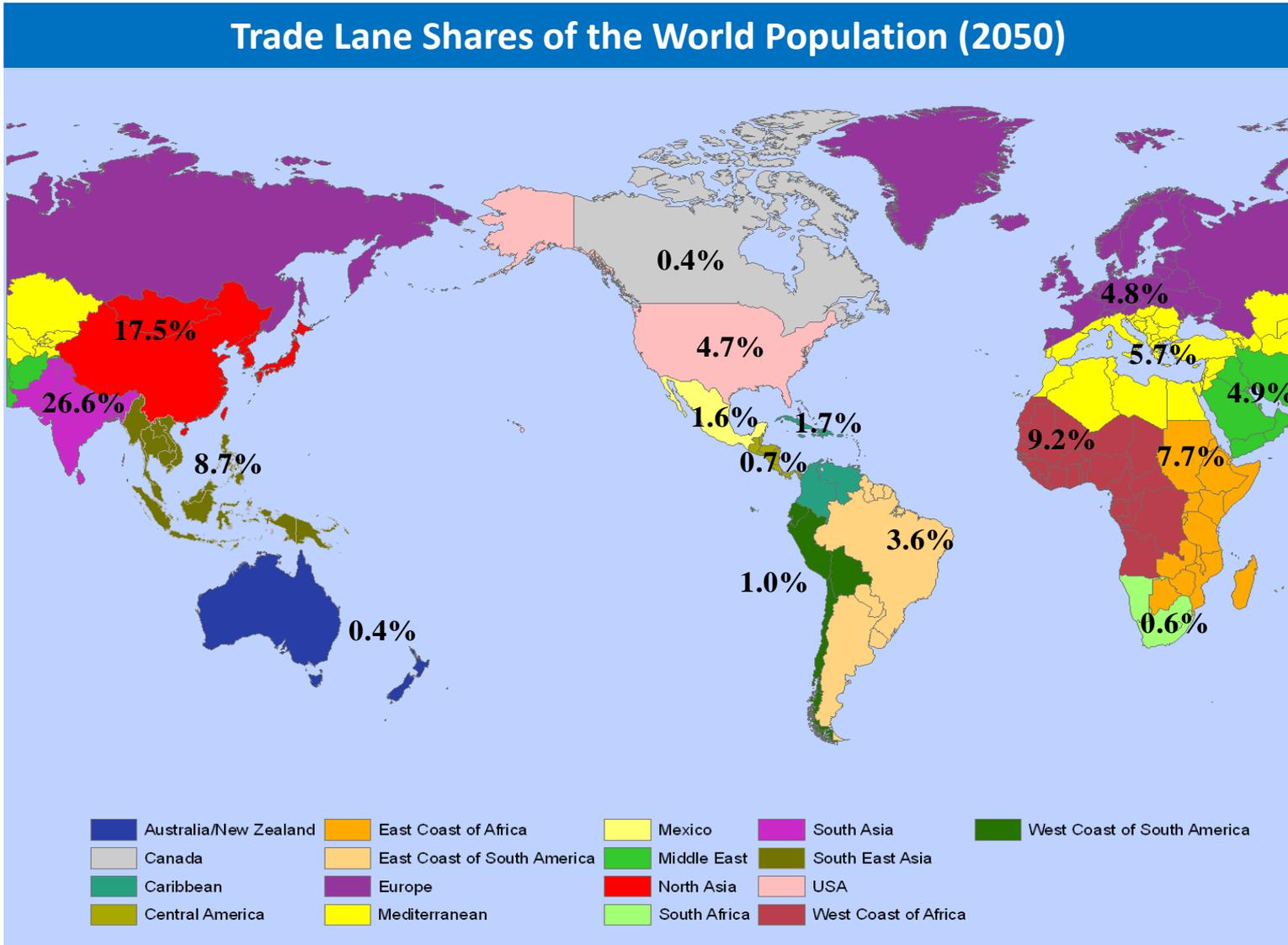
2012 Rank	1982	1992	2002	2012
1	US	US	US	US
2	Japan	Japan	China	China
3	Germany	Germany	Japan	India
4	France	China	Germany	Japan
5	Italy	Russia	India	Germany
6	UK	France	France	Russia
7	Brazil	Italy	UK	Brazil
8	Mexico	UK	Italy	UK
9	India	India	Brazil	France
10	China	Brazil	Russia	Italy
11	Spain	Mexico	Mexico	Mexico
12	Canada	Spain	Spain	Korea
13	Australia	Canada	Canada	Canada
14	Netherlands	Korea	Korea	Spain
15	Saudi Arabia	Indonesia	Australia	Indonesia

Real GDP Growth: 1980 -2018E



Asia will still have the largest share of world population in 2050

South Asia, Africa, Middle East gain the most.... North Asia, Europe, Mediterranean lose the most.

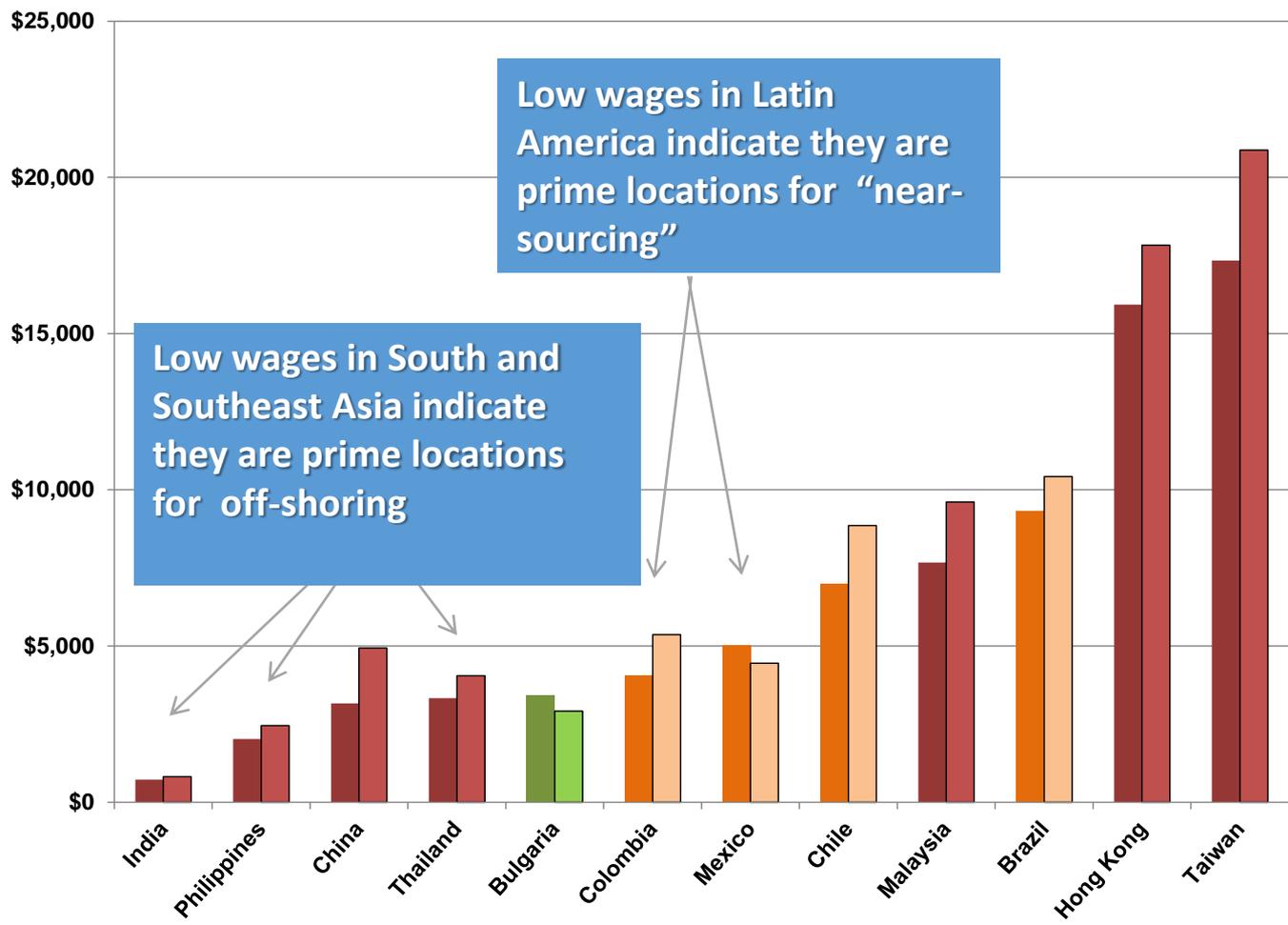


Source: International Monetary Fund, Moffatt & Nichol

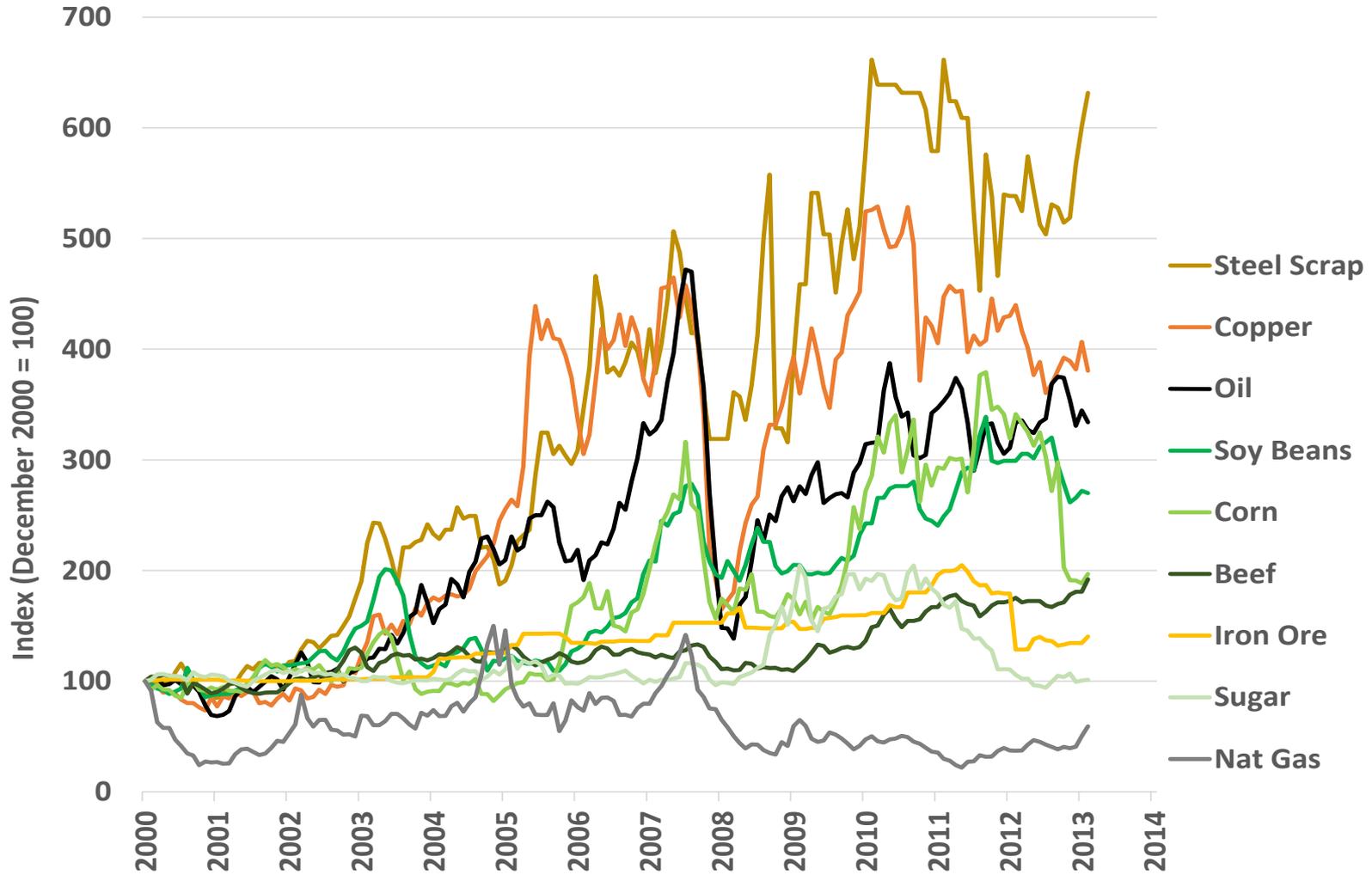
If not China, then where?

It is unlikely that manufactured goods which are labor intensive will be manufactured in the US. South/Southeast Asia and Central America appear to be well-positioned to take up the slack. South/SE Asia favors East Coast ports. Central America, Mexico in particular could hurt port volumes.

Manufacturing Wage Comparisons in US\$ in 2008 and 2012E



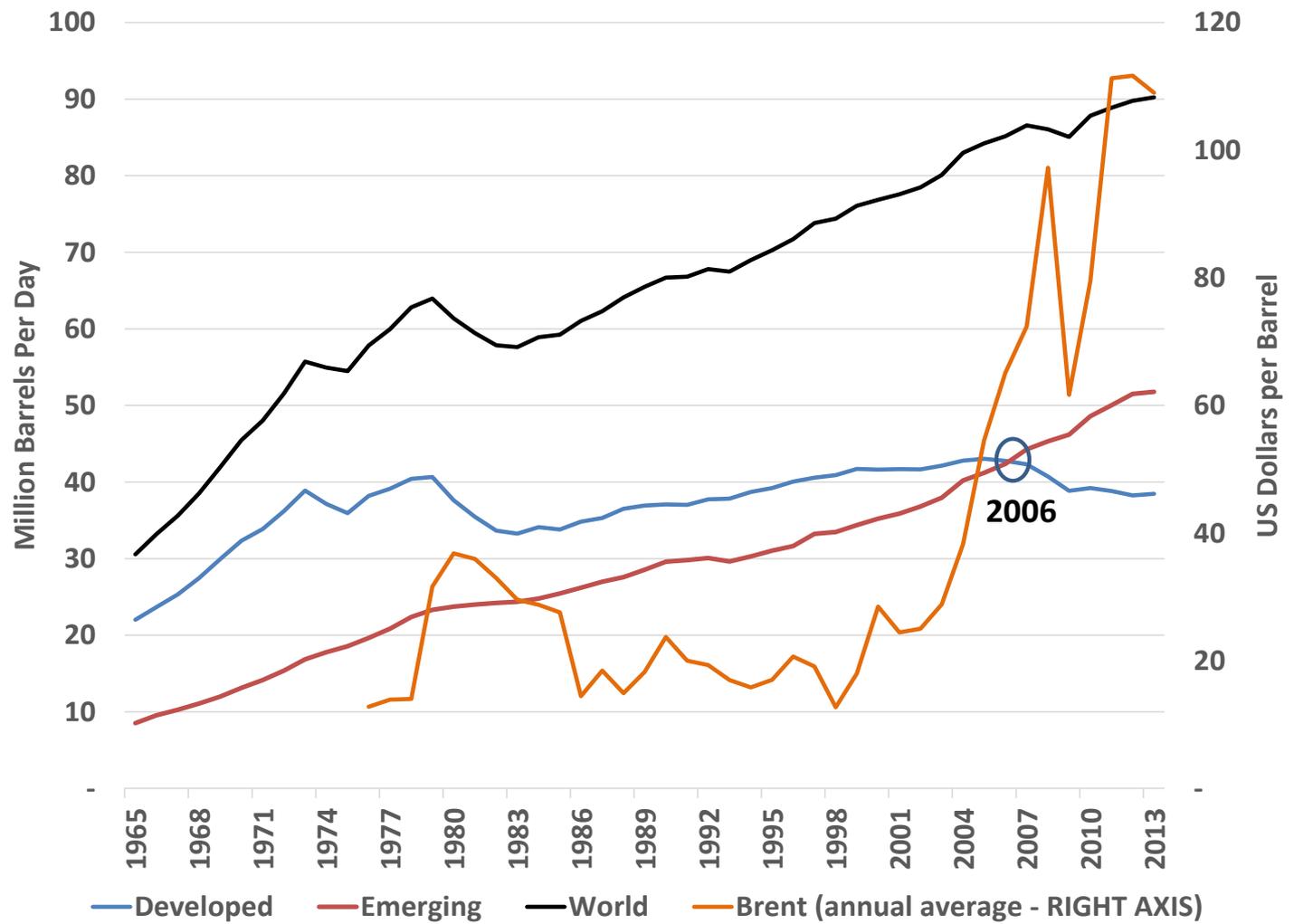
Commodity Prices Indexed To 100 in Dec 2000



World oil consumption growth driven by developing economies

Since 1973 oil consumption in developing economies has been the main driver of global trends.

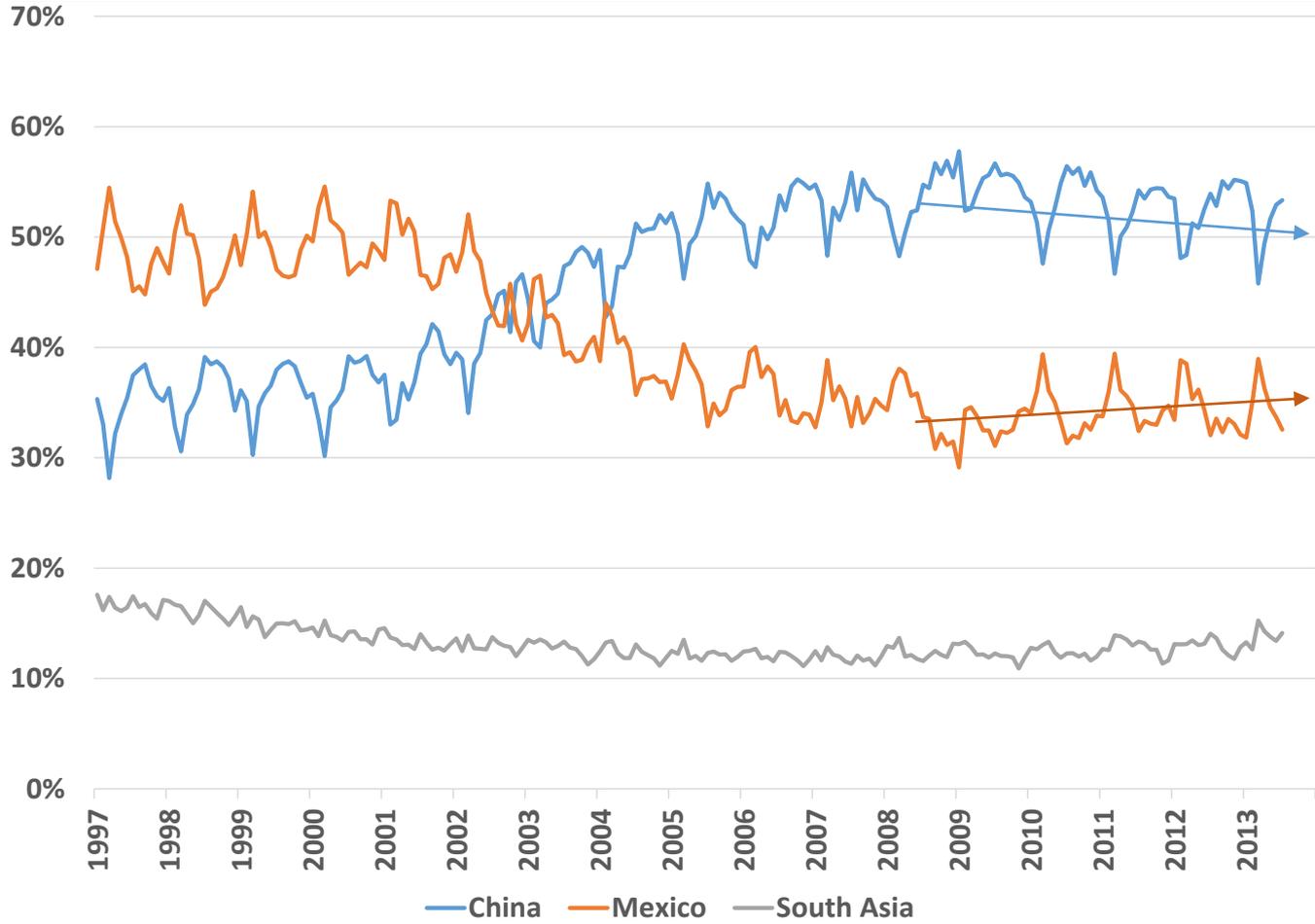
Global Oil Consumption and Brent Price



China may be giving up on developed economies

China allowed the yuan to appreciate since 2009 while it lost share of US imports. Mexico and India have lower raw material costs and cheaper labor. Mexico has lower transportation costs to/from the US. Given China's most recent 5-Year Plan which focuses on developing domestic consumption to reduce dependency on exports, it may be the case that it just doesn't care about losing share of US imports.

Share of US Import Value From China, S Asia and Mexico

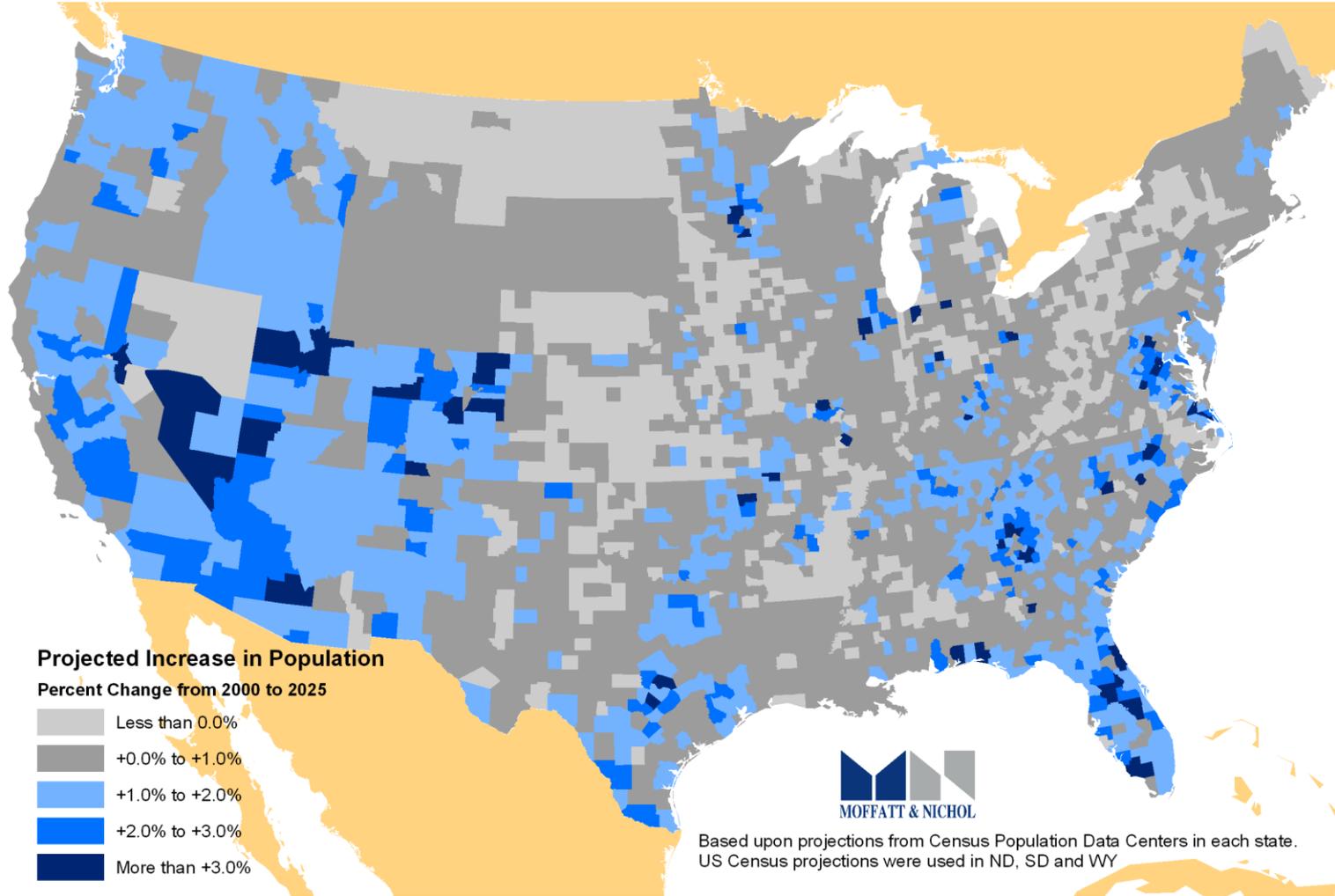




Imports will come from and go to different locations

According to the Census Bureau, the Gulf Coast, except for the Panama City to Beaumont stretch, will see higher growth than the national average. But macroeconomic and industry trends could see higher population growth in the Gulf Coast than currently projected by the Census Bureau.

Projected Growth in Population By County



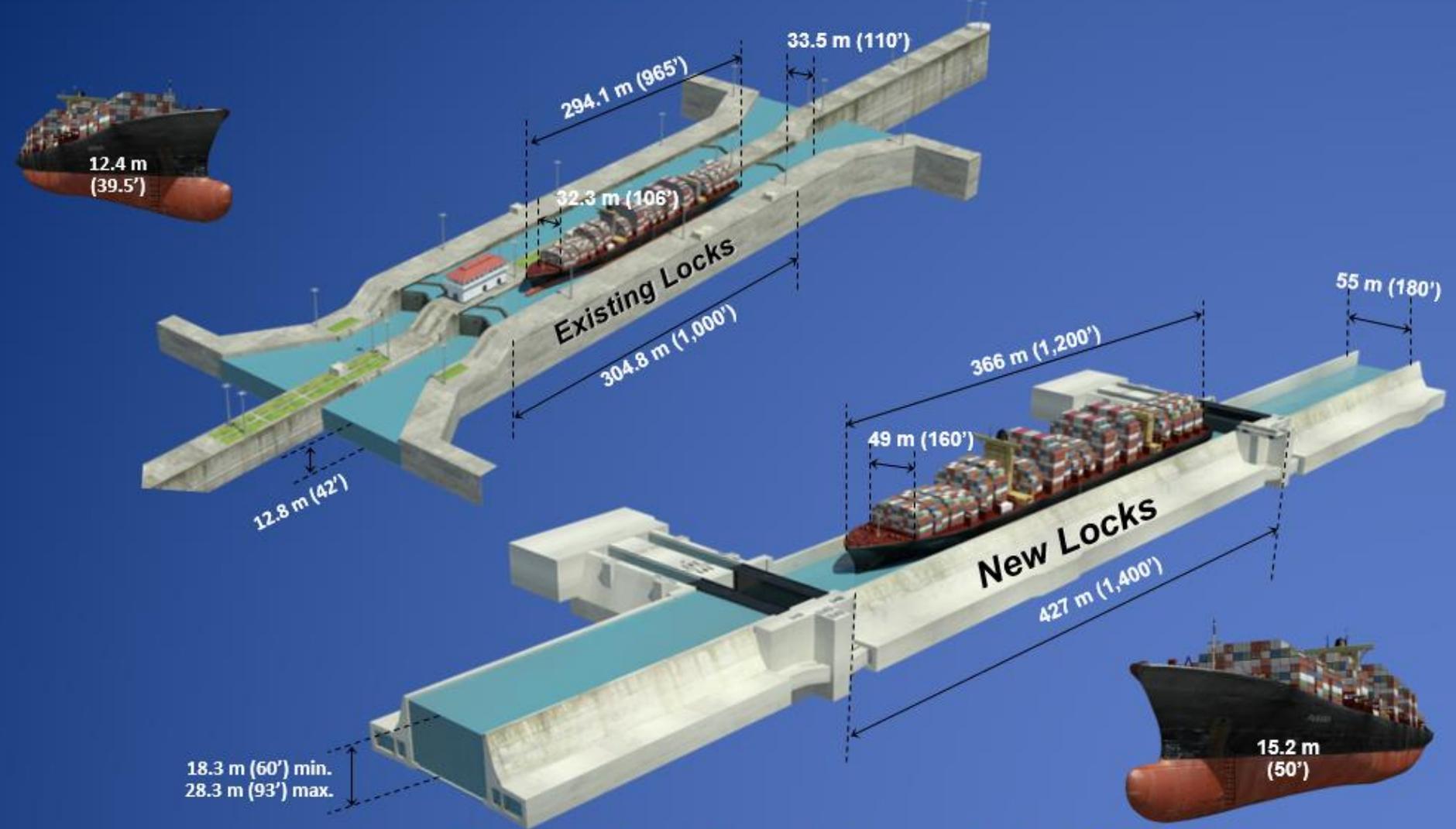
Source: Census Bureau, Moffatt & Nichol

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Existing and new dimensions of Panama Canal locks and ships

Maximum size of vessels in existing Locks: 4,400 – 5000 TEU



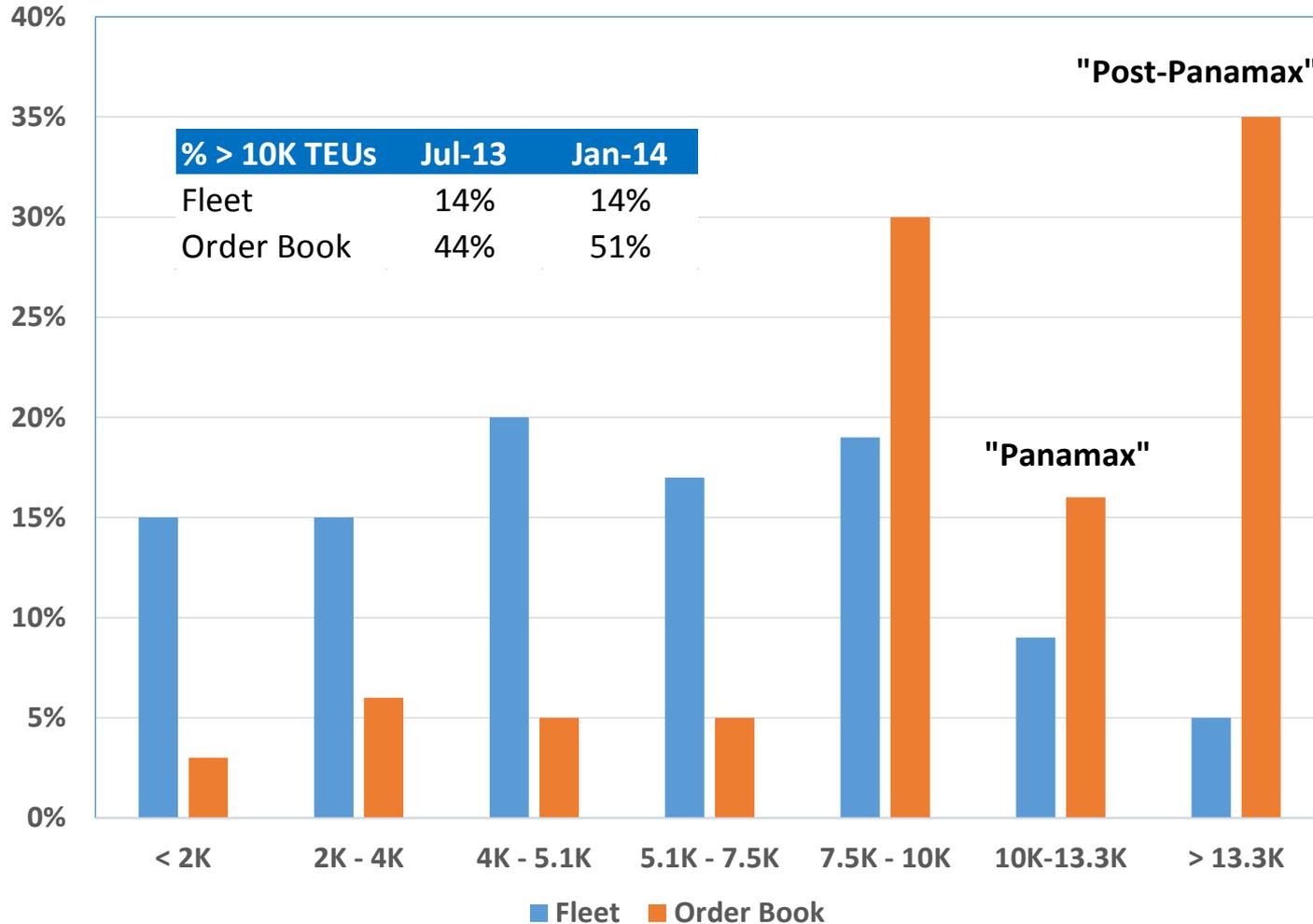
Maximum size of vessels in new locks: 13,200 TEU

Source: Panama Canal Authority

Larger vessels are gaining share of the global fleet

Ocean carriers are ordering larger vessels to offset fuel costs and remain competitive. This has left the industry with large financial liabilities and excess capacity. Ocean rates are substantially lower than before the global financial crisis began and unlikely to recover soon.

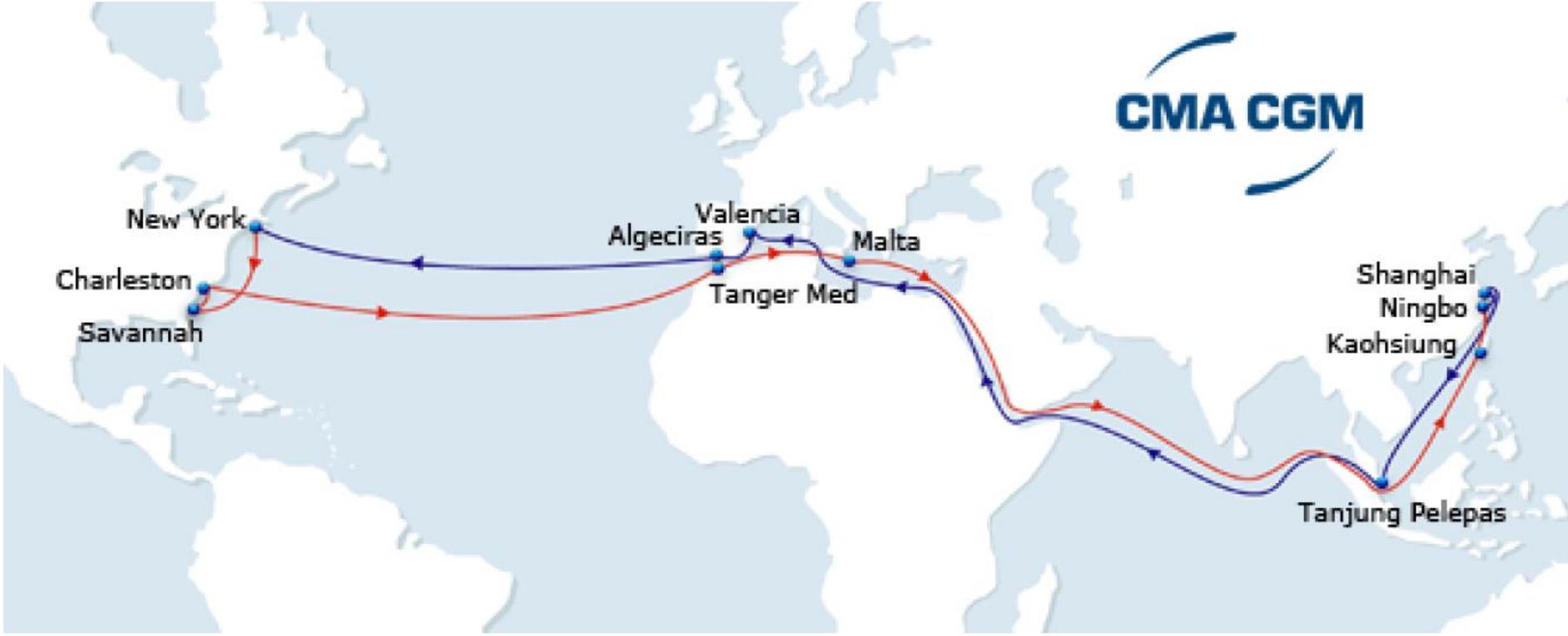
Global Fleet Composition by Capacity



Ocean carriers are adjusting their services to constraints

Maersk shifted the major TP7 North Asia to US East Coast service from the Panama Canal, which is constrained to vessels with 4,500 TEU capacity, to the Suez Canal where it is utilizing vessels of 9,000 TEU capacity. Other liners, such as CMA CGM offer Asia to USEC services through the Suez Canal.

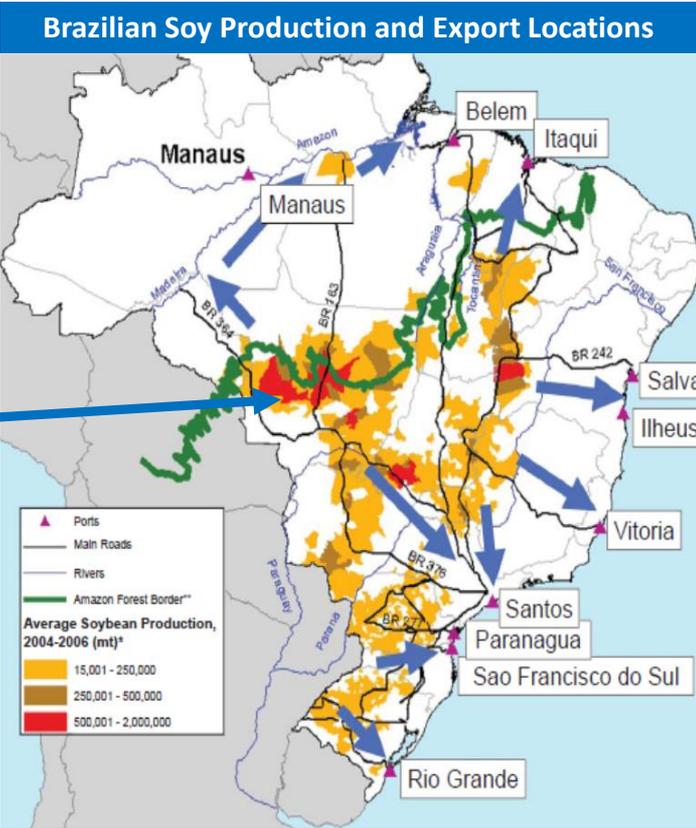
CMA CGM's Vespucci Westbound Service



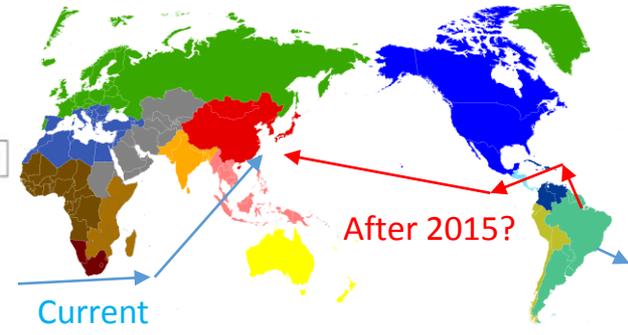
Brazil Is making a major infrastructure development policy change

Brazil's exports have underperformed but a major infrastructure development policy is in the process of being rolled out. Panama Canal expansion could be a game changer for Brazilian soy exports as the government seeks to develop inland ports on rivers feeding into the Amazon River for transshipment to large bulkers transiting the canal.

Brazil's Serrado Is Larger Than The Top 10 Cornbelt States Combined



Soy Export Routes To China



Brazil could overcome US agricultural export competitiveness

Agricultural productivity is rising in the Americas but weakening in Asia. The US can benefit from this, if US 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 could decline 34% and have a \$180 per ton advantage from the Cerrado to Shanghai over Davenport to Shanghai.**

Costs of transporting soybeans, U.S. vs. Brazil. Price per metric ton in 2012 – Q3

	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

Source: U.S. Department of Agriculture

Valor Agronegócios

Saída pelo Norte reduzirá em 34% custo de frete

Logística: Alínea de diminuir gasto para escoar safra de grãos de MT, caminho viabiliza uso do canal do Panamá

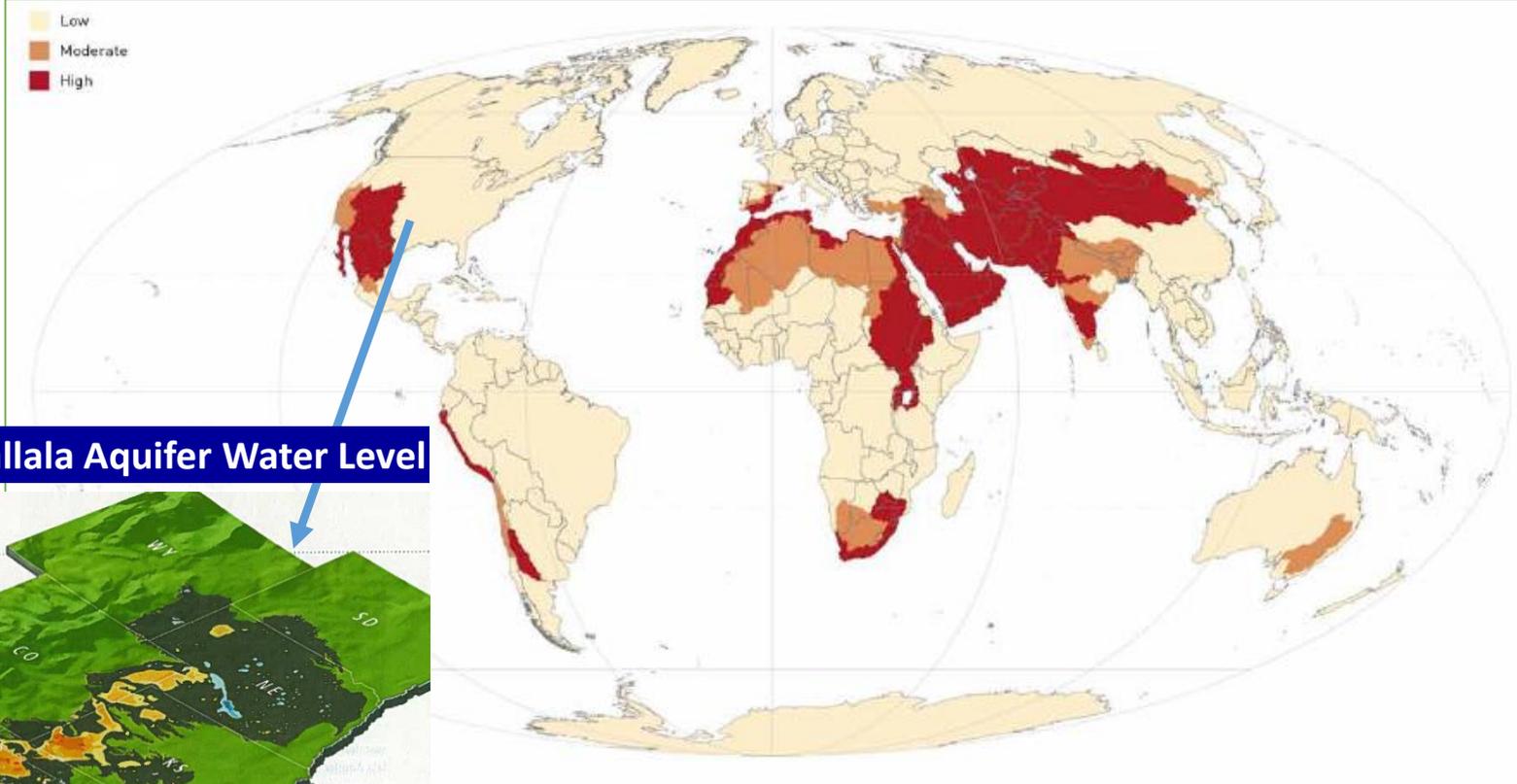
32,25 milhões de toneladas

Em MT, caminhões estão parados por falta de motoristas

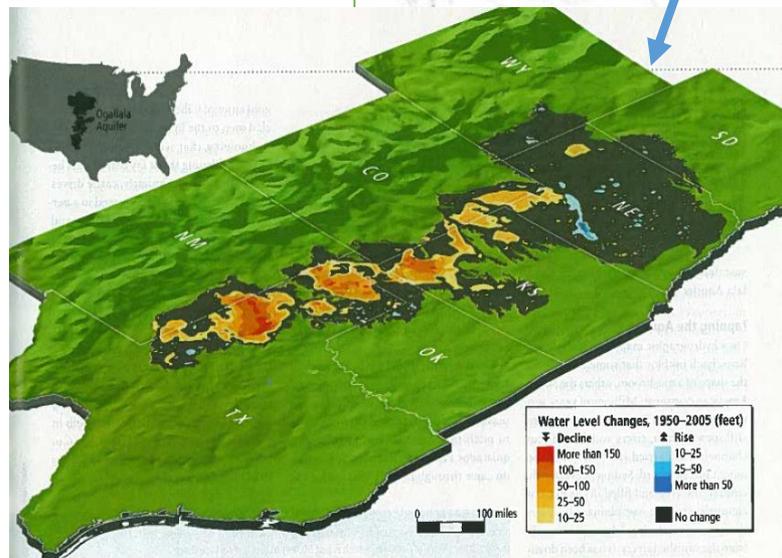
Water is the ignored looming resource crisis

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 by major river basin



Changes In The Ogallala Aquifer Water Level



Regulatory and Policy Issues

Trade policies and cargo handling regulations are constantly changing. These can make or break a port's prosperity.

- **Foreign Trade Agreements – 122 world wide, the US has 20% of these but has been a driver of GATT/WTO**
- **Regional FTAs – NAFTA, ASEAN**
- **Export restrictions**
- **Recent freight Handling/Operations Regulations**
 - Food Safety Modernization Act
 - Federal Motor Carrier Safety Act

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Moffatt & Nichol was founded in 1945 to provide engineering and consultancy services to the world's maritime industry.

Today, Moffatt & Nichol supports port and maritime projects, transportation infrastructure, coastal and environmental restorations, and waterfront developments worldwide.

Our capabilities allow us to take a project from conception, through the critical study and analysis process and on to design, engineering and program management. Clients can expect thoroughly integrated projects, completed under exacting quality control standards, with the innovation and creativity for which our firm is known worldwide.

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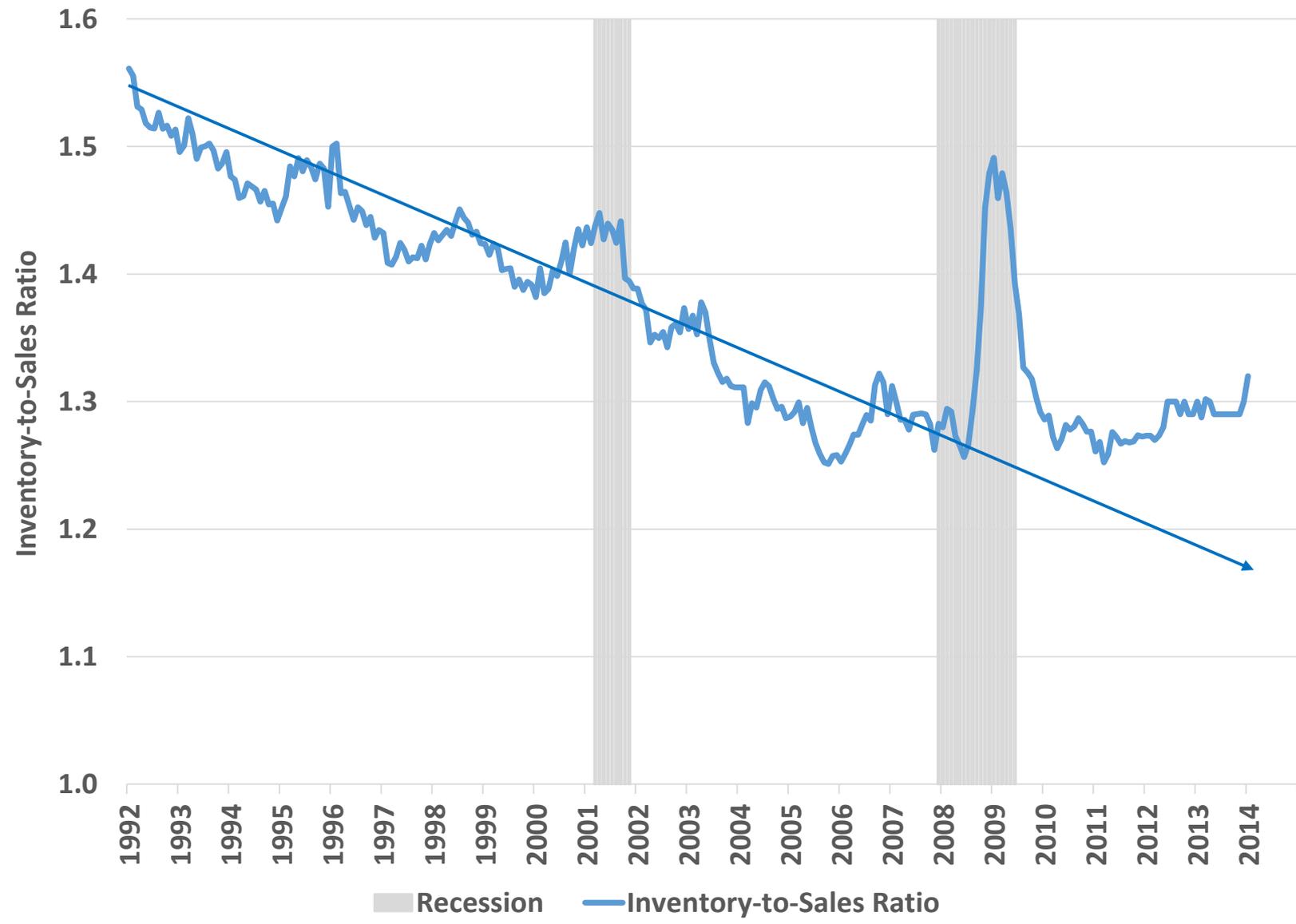
Naval & Coast Guard Bases

Wind Power Development Projects

Economic & Market Studies

Inspection & Rehabilitation Projects

US Inventory to Sales Ratio: 1997 – 2013



US Major Port Container Volumes (TEUs) By Type

