Many moving parts
Commentary and presentation materials on this occasion are based on the personal views of the speaker and may not coincide with opinions held by Moffatt & Nichol or its employees.

Moffatt & Nichol Background

- Established in 1945 in Long Beach, California, currently:
  - Offices in the Americas, Europe, Middle East and Pacific Rim
- 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
  - Environment issues/emission modeling
  - Port security
Focus points

• Exports are a national economic priority

• Growing global middle class is the opportunity but also the ultimate logistics challenge

• The US must improve freight corridor productivity to match or exceed that of its competitors in the global market place
  • Condition of infrastructure, capacity, congestion, chassis and container availability, coordination of investments, capital availability are increasing costs while currency trends increasingly favor competitors
US and a few other countries have led global growth
Strengthening US Dollar may help imports and hurt exports

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

Weaker Dollar, Lower US interest rates

Stronger Dollar, Higher US interest rates

Source: Trading Economics, Moffatt & Nichol
The “Grey Tsunami”

The US has an increasing share of its population that is of retirement age. This impacts labor availability and consumer spending. This trend is not unique to the US but common across developed economies.

Source: IMF, Census Bureau, Moffatt & Nichol
Wage differentials drove offshoring now near and on-shoring

Manufacturing Wage Comparisons in US$ in 2008 and 2014E

Source: UN ILO, Moffatt & Nichol
The world wants to trade

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

- Free Trade Agreements
- Information/Communication Technology
- Maritime and Inland Connectivity Infrastructure
- Demographic Trends

Source: WTO, Moffatt & Nichol
The global economy

**TOP 10 POPULATIONS BY COUNTRY**

- China: 1,400 million
- India: 1,280 million
- United States: 320 million
- Indonesia: 260 million
- Brazil: 210 million
- Pakistan: 200 million
- Nigeria: 200 million
- Bangladesh: 170 million
- Russia: 150 million
- Japan: 130 million

*Source: IMF WEO, Moffatt & Nichol*

**TOP 10 GDPs BY COUNTRY**

- United States: $20 trillion
- China: $18 trillion
- Japan: $7 trillion
- Germany: $5 trillion
- United Kingdom: $4 trillion
- France: $3 trillion
- Brazil: $2 trillion
- Italy: $2 trillion
- India: $1 trillion
- Russia: $1 trillion

*Source: IMF WEO, Moffatt & Nichol*
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 must 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.

Source: OECD, US Census Bureau
The US has helped the world economy develop, particularly emerging market economies, by allowing its trade balance to be in deficit. This isn’t sustainable in the long run. Reducing the trade deficit is important for employment and therefore economic growth. The decreasing US oil trade deficit has directly helped strengthen our goods balance and in the process helped US employment recover from the deep 2007-2009 recession. But more, a further reduction in the deficit, is needed.

Source: US Census Bureau, Moffatt & Nichol
What can the US competitively export?

Agriculture, Capital Goods, 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 advantage (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.

Agriculture dominates both top ten lists.

Source: US Census Bureau, Moffatt &Nichol

<table>
<thead>
<tr>
<th>Containerized</th>
<th>Score</th>
<th>Bulk/Breakbulk</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood Pulp Scrap and Waste</td>
<td>9.4</td>
<td>Oil Seeds (Soy)</td>
<td>32.7</td>
</tr>
<tr>
<td>Oil Seeds (Soy)</td>
<td>1.1</td>
<td>Meat and Other Edible Animal Parts</td>
<td>28.7</td>
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<tr>
<td>Raw Hides and Leather</td>
<td>0.8</td>
<td>Cereal Grains</td>
<td>3.9</td>
</tr>
<tr>
<td>Cotton – Untreated, Yarn and Woven Fabric</td>
<td>0.7</td>
<td>Animal Feed</td>
<td>3.4</td>
</tr>
<tr>
<td>Animal Feed</td>
<td>0.7</td>
<td>Wood and Charcoal</td>
<td>0.4</td>
</tr>
<tr>
<td>Meat and Other Edible Animal Parts</td>
<td>0.3</td>
<td>Crude Oil and Refined Petroleum/Natural Gas Products</td>
<td>0.3</td>
</tr>
<tr>
<td>Plastic Feedstock and Manufactured Goods</td>
<td>0.2</td>
<td>Live Animals</td>
<td>0.2</td>
</tr>
<tr>
<td>Iron and Steel</td>
<td>0.1</td>
<td>Wood Pulp Scrap and Waste</td>
<td>0.2</td>
</tr>
<tr>
<td>Paper and Paperboard</td>
<td>0.1</td>
<td>Fish and Crustaceans</td>
<td>0.1</td>
</tr>
<tr>
<td>Chemical Products</td>
<td>0.1</td>
<td>Dairy Products, including Eggs and Honey</td>
<td>0.1</td>
</tr>
<tr>
<td>Cereals</td>
<td>0.1</td>
<td>Organic Chemicals</td>
<td>0.1</td>
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<tr>
<td>Organic Chemicals</td>
<td>0.1</td>
<td>Plastics Feedstock and Manufactured Goods</td>
<td>0.1</td>
</tr>
</tbody>
</table>

*Based on relative comparative advantage as defined by Bela Belassi
US energy production exceeds previous peak levels

PETROLEUM AND NATURAL GAS PRODUCTION: 1965 - 2014

Billion cubic feet of natural gas per day (LEFT)
Thousand barrels of oil daily (RIGHT)

Source: British Petroleum, Moffatt & Nichol
US manufacturing is growing but using less labor

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.

Source: Federal Reserve, Labor Department, Moffatt & Nichol
China’s increasing food consumption ahead of GDP growth

**FOOD CONSUMPTION VS GDP/CAPITA, 1990-2012**

**PERCENT OF CHINA’S POPULATION UNDERNOURISHED**

Source: FAO, IMF WEO, Moffatt & Nichol
Water is the overlooked looming resource crisis

GLOBAL DISTRIBUTION OF PHYSICAL WATER SCARCITY

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.

Source: UN-FAO, US Government Agencies
Deteriorating US inland infrastructure a serious problem

Soybean Transportation Coalition studied US inland waterways. Key points: 54% of the Inland Marine Transportation System’s (IMTS) structures are more than 50 years old and 36% are more than 70 years old. Along with water issues probably, this has impacted where grain is produced and exported. Grain increasingly moves on steel rivers (railways).
### US Grain and Oilseed Exports (Million Metric Tons) by Destination

#### Share Distribution

<table>
<thead>
<tr>
<th>Region</th>
<th>2003</th>
<th>2005</th>
<th>2007</th>
<th>2009</th>
<th>2011</th>
<th>2013</th>
<th>2014</th>
<th>+/- Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia - East &amp; Southeast</td>
<td>52%</td>
<td>53%</td>
<td>50%</td>
<td>63%</td>
<td>60%</td>
<td>62%</td>
<td>62%</td>
<td>10%</td>
</tr>
<tr>
<td>China</td>
<td>11%</td>
<td>10%</td>
<td>10%</td>
<td>21%</td>
<td>21%</td>
<td>34%</td>
<td>30%</td>
<td>19%</td>
</tr>
<tr>
<td>South &amp; Central America</td>
<td>14%</td>
<td>15%</td>
<td>15%</td>
<td>13%</td>
<td>11%</td>
<td>15%</td>
<td>17%</td>
<td>3%</td>
</tr>
<tr>
<td>Africa</td>
<td>13%</td>
<td>14%</td>
<td>14%</td>
<td>9%</td>
<td>11%</td>
<td>7%</td>
<td>6%</td>
<td>-6%</td>
</tr>
<tr>
<td>Europe</td>
<td>9%</td>
<td>5%</td>
<td>7%</td>
<td>4%</td>
<td>4%</td>
<td>6%</td>
<td>6%</td>
<td>-3%</td>
</tr>
<tr>
<td>North America</td>
<td>9%</td>
<td>7%</td>
<td>6%</td>
<td>7%</td>
<td>7%</td>
<td>6%</td>
<td>6%</td>
<td>-3%</td>
</tr>
<tr>
<td>Middle East</td>
<td>4%</td>
<td>5%</td>
<td>7%</td>
<td>4%</td>
<td>6%</td>
<td>3%</td>
<td>3%</td>
<td>-1%</td>
</tr>
<tr>
<td>Asia - South</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Source: US Census Bureau, Moffatt & Nichol
East coast grain and oil seed destinations are more diversified

COLOMBIA-SNAKE
- 25 M tons
  - 99% bulk
  - 1% containerized
- Destinations:
  - Asia - East & Southeast
  - S. & Cent. America
  - Middle East
  - Asia - South

SEATTLE, WA
- 11 M tons
  - 83% bulk
  - 17% containerized
- Destinations:
  - Asia - East & Southeast
  - Middle East
  - Aus & Oceania
  - S. & Cent. America
  - Europe
  - Other

LA/LB
- 4 M tons
  - 24% bulk
  - 76% containerized
- Destinations:
  - Asia - East & Southeast
  - Middle East
  - S. & Cent. America
  - Asia - South
  - Europe
  - Other

NEW ORLEANS, LA
- 69 M tons
  - 100% bulk
  - 0% containerized
- Destinations:
  - Asia - East & Southeast
  - S. & Cent. America
  - North America
  - Europe
  - Africa
  - Other

NORFOLK, VA
- 3 M tons
  - 77% bulk
  - 23% containerized
- Destinations:
  - Asia - East & Southeast
  - S. & Cent. America
  - Africa
  - Europe
  - North America
  - Other

NY/NJ
- 800,000 tons
  - 53% bulk
  - 47% containerized
- Destinations:
  - Asia - East & Southeast
  - Africa
  - S. & Cent. America
  - North America
  - Europe
  - Other

*2014 values

Source: US Trade Online, Moffatt & Nichol
West Coast ports remain as low cost path to US heartlands

PORT OF OAKLAND’S COST DIFFERENTIAL OF SERVING INLAND EXPORTS OF A SPECIFIC COMMODITY DESTINED TO NORTH ASIA

Focus is not on segments of supply chains but total gateway operating costs

Source: Moffatt & Nichol
Ships continue to get larger

**EVOLUTION OF CONTAINERSHIP SIZE**

- **CONVERTED CARGO VESSEL • <800TEU**
- **CELLULAR CONTAINERSHIP • 1,000-2,500TEU**
- **PANAMAX • 3,000-4,000TEU**
- **POST-PANAMAX • 4,000-5,000TEU**
- **POST-PANAMAX PLUS • 5,000-8,000TEU**
- **ULCS • 11,000-14,500TEU**
- **TRIPLE-E • 18,000TEU**

**FLEET CAPACITY BREAKDOWN BY TEU SIZE RANGE**

**As of November 1, 2012**
- 12% > 10K
- 7,500-9,999 17%
- 5,100-7,499 18%
- 4,000-5,099 21%
- 3,000-3,999 6%
- 2,000-2,999 11%
- 1,500-1,999 6%
- 1,000-1,499 5%
- 100-999 4%
- >10,000 12%

**As of April 1, 2015**
- 20% > 10K
- 7,500-9,999 19%
- 5,100-7,499 17%
- 4,000-5,099 18%
- 3,000-3,999 5%
- 2,000-2,999 9%
- 1,500-1,999 4%
- 1,000-1,499 3%
- 100-999 3%
- >13,000 9%
- 10,000-12,999 11%

Source: Alphaliner, Moffatt & Nichol
More freight in fewer gateways

As volumes concentrate in fewer ships to reduce average fixed costs per slot, they concentrate in fewer ports to increase revenue-generating time.

Source: AAPA, Moffatt & Nichol
Congestion is a global problem that needs local solutions.
Empty container availability is very poor in 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.

Source: US Department of Agriculture, Moffatt & Nichol
Brazil is becoming a competitive soy supplier

Source: U.S. Department of Agriculture, Agronegocios
# Global grain and oilseed origin-destination matrix

## 2014 Grain and Oilseed trade (tons)

<table>
<thead>
<tr>
<th>Importer/Exporter</th>
<th>Argentina</th>
<th>Australia</th>
<th>Brazil</th>
<th>Canada</th>
<th>China</th>
<th>Egypt</th>
<th>Europe</th>
<th>Japan</th>
<th>Mexico</th>
<th>USA</th>
<th>Total Imports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>-</td>
<td>1,270</td>
<td>3,330</td>
<td>691</td>
<td>204</td>
<td>322</td>
<td>1,555</td>
<td>9</td>
<td>577</td>
<td>7,035</td>
<td>15,423</td>
</tr>
<tr>
<td>Australia</td>
<td>9,844</td>
<td>-</td>
<td>1,062</td>
<td>5,208</td>
<td>14,857</td>
<td>532</td>
<td>5,292</td>
<td>1,075</td>
<td>256</td>
<td>25,948</td>
<td>64,758</td>
</tr>
<tr>
<td>Brazil</td>
<td>2,250,548</td>
<td>208</td>
<td>-</td>
<td>333,963</td>
<td>2,965</td>
<td>2,080</td>
<td>31,803</td>
<td>51</td>
<td>689</td>
<td>2,643,076</td>
<td>5,265,382</td>
</tr>
<tr>
<td>Canada</td>
<td>11,316</td>
<td>2,484</td>
<td>468</td>
<td>-</td>
<td>35,611</td>
<td>727</td>
<td>13,665</td>
<td>398</td>
<td>3,333</td>
<td>2,012,090</td>
<td>2,083,659</td>
</tr>
<tr>
<td>China</td>
<td>6,079,790</td>
<td>6,478,282</td>
<td>32,690,179</td>
<td>6,622,781</td>
<td>-</td>
<td>317</td>
<td>2,932,884</td>
<td>1,359</td>
<td>297</td>
<td>39,125,889</td>
<td>93,932,225</td>
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<tr>
<td>Egypt</td>
<td>1,944,321</td>
<td>282,408</td>
<td>1,521,882</td>
<td>94,788</td>
<td>48,193</td>
<td>6,643,113</td>
<td>36</td>
<td>133</td>
<td>3,991,487</td>
<td>14,526,405</td>
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<tr>
<td>Europe*</td>
<td>458,308</td>
<td>881,442</td>
<td>5,205,682</td>
<td>3,565,271</td>
<td>143,432</td>
<td>20,288,066</td>
<td>653</td>
<td>142,873</td>
<td>4,425,298</td>
<td>35,175,003</td>
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<tr>
<td>Japan</td>
<td>673,313</td>
<td>2,381,731</td>
<td>1,922,983</td>
<td>4,979,386</td>
<td>279,192</td>
<td>972,978</td>
<td>-</td>
<td>1,830</td>
<td>19,821,388</td>
<td>31,034,768</td>
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</tr>
<tr>
<td>Mexico</td>
<td>15,170</td>
<td>60,340</td>
<td>76,284</td>
<td>2,520,058</td>
<td>12,309</td>
<td>34,297</td>
<td>15</td>
<td>18,384,491</td>
<td>21,103,106</td>
<td></td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>172,906</td>
<td>175,746</td>
<td>1,089,635</td>
<td>8,123,964</td>
<td>115,044</td>
<td>364,225</td>
<td>801</td>
<td>208,012</td>
<td>2,643,076</td>
<td>213,461,705</td>
<td></td>
</tr>
<tr>
<td><strong>Total Exports</strong></td>
<td><strong>11,615,949</strong></td>
<td><strong>10,264,594</strong></td>
<td><strong>42,511,506</strong></td>
<td><strong>26,249,675</strong></td>
<td><strong>652,255</strong></td>
<td><strong>80,740</strong></td>
<td><strong>31,287,877</strong></td>
<td><strong>4,398</strong></td>
<td><strong>357,999</strong></td>
<td><strong>90,436,712</strong></td>
<td><strong>213,461,705</strong></td>
</tr>
</tbody>
</table>

*Europe includes France, Germany, Italy, Spain, Ukraine, United Kingdom

**Font**
- decreased imports since 2000

## 2000 Grain and Oilseed trade (tons)

<table>
<thead>
<tr>
<th>Importer/Exporter</th>
<th>Argentina</th>
<th>Australia</th>
<th>Brazil</th>
<th>Canada</th>
<th>China</th>
<th>Egypt</th>
<th>Europe</th>
<th>Japan</th>
<th>Mexico</th>
<th>USA</th>
<th>Total Imports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>-</td>
<td>4,860</td>
<td>10,242</td>
<td>1,554</td>
<td>68</td>
<td>102</td>
<td>20,526</td>
<td>7</td>
<td>440</td>
<td>15,743</td>
<td>53,542</td>
</tr>
<tr>
<td>Australia</td>
<td>2,166</td>
<td>-</td>
<td>826</td>
<td>1,261</td>
<td>9,734</td>
<td>422</td>
<td>3,303</td>
<td>581</td>
<td>1,635</td>
<td>184,177</td>
<td>204,107</td>
</tr>
<tr>
<td>Brazil</td>
<td>9,509,342</td>
<td>290</td>
<td>-</td>
<td>183,410</td>
<td>20,157</td>
<td>295</td>
<td>43,326</td>
<td>57</td>
<td>530</td>
<td>2,941,587</td>
<td>3,141,402</td>
</tr>
<tr>
<td>Canada</td>
<td>64,345</td>
<td>5,884</td>
<td>4</td>
<td>-</td>
<td>44,694</td>
<td>562</td>
<td>68,538</td>
<td>13,535</td>
<td>2,323</td>
<td>2,941,517</td>
<td>3,141,402</td>
</tr>
<tr>
<td>China</td>
<td>2,824,982</td>
<td>2,217,954</td>
<td>2,119,581</td>
<td>2,326,333</td>
<td>-</td>
<td>0</td>
<td>1,001,411</td>
<td>1,128</td>
<td>100</td>
<td>5,596,502</td>
<td>16,087,990</td>
</tr>
<tr>
<td>Egypt</td>
<td>1,310,460</td>
<td>567,628</td>
<td>30,086</td>
<td>86,156</td>
<td>287,236</td>
<td>-</td>
<td>343,410</td>
<td>96</td>
<td>8,356</td>
<td>8,447,673</td>
<td>11,081,101</td>
</tr>
<tr>
<td>Europe*</td>
<td>2,157,218</td>
<td>762,427</td>
<td>3,292,784</td>
<td>1,454,948</td>
<td>170,281</td>
<td>17,483</td>
<td>18,150,790</td>
<td>607</td>
<td>921</td>
<td>5,725,389</td>
<td>31,732,850</td>
</tr>
<tr>
<td>Japan</td>
<td>559,640</td>
<td>4,136,307</td>
<td>751,561</td>
<td>4,800,186</td>
<td>897,493</td>
<td>4,946</td>
<td>431,956</td>
<td>-</td>
<td>8,775</td>
<td>25,961,518</td>
<td>37,552,382</td>
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<tr>
<td>Mexico</td>
<td>18,808</td>
<td>119,393</td>
<td>156,362</td>
<td>1,892,672</td>
<td>9,570</td>
<td>2</td>
<td>40,602</td>
<td>45</td>
<td>-</td>
<td>17,429,372</td>
<td>19,666,826</td>
</tr>
<tr>
<td>USA</td>
<td>106,382</td>
<td>325,986</td>
<td>3,247</td>
<td>61,074,305</td>
<td>25,508</td>
<td>4,580</td>
<td>80,399</td>
<td>1,323</td>
<td>95,716</td>
<td>-</td>
<td>61,717,446</td>
</tr>
<tr>
<td><strong>Total Exports</strong></td>
<td><strong>16,553,342</strong></td>
<td><strong>8,140,729</strong></td>
<td><strong>6,364,692</strong></td>
<td><strong>71,820,826</strong></td>
<td><strong>1,464,742</strong></td>
<td><strong>28,392</strong></td>
<td><strong>20,184,262</strong></td>
<td><strong>17,378</strong></td>
<td><strong>118,796</strong></td>
<td><strong>66,403,472</strong></td>
<td><strong>191,096,632</strong></td>
</tr>
</tbody>
</table>

*Europe includes France, Germany, Italy, Spain, Ukraine, United Kingdom

**Font**
- net exporter
Re-cap

• Exports are a national economic priority

• Growing global middle class is the opportunity but also the ultimate logistics challenge

• The US must improve freight corridor productivity to match or exceed that of its competitors in the global market place
  • Condition of infrastructure, capacity, congestion, chassis and container availability, coordination of investments, capital availability are increasing costs while currency trends increasingly favor competitors
>680M short tons of cargo was moved on the Mississippi in 2012

CARGO MOVING ON MISSISSIPPI RIVER – DOMESTIC FUEL FLOWS DOMINATE BUT EXPORTS ARE GROWING FASTER

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Source: USACE
>100M short tons of cargo was moved on the Columbia River in 2012

CARGO MOVING ON COLUMBIA RIVER – EXPORTS DOMINATE AND AGRICULTURE HAS THE LARGEST SHARE

Exports

Total Domestic

Imports

Source: USACE

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