Potential Impacts of Panama Canal Expansion on U.S. Cotton

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Overview

Background
Based on AMS Project Results by R. Costa, P. Rosson, F. Adcock, F. Fraire, J. Robinson & S. Fuller

Results

Conclusions & Implications
Background

Global Cotton Distribution

The major players in the world are China and the U.S., FAS, USDA

Production (1,000 480 lb bales)

Consumption (1,000 480 lb bales)

Exports (1,000 480 lb bales)

Imports (1,000 480 lb bales)
Major U.S. cotton export destinations

Historically, the top 3 destinations for U.S. cotton exports are China, Turkey, and Mexico
Background (cont.)

Major U.S. cotton export ports

Historically, the top 3 U.S. cotton exporting ports are Long-Beach/Los Angeles ports, Savannah and Houston

Figure 3. U.S. Cotton Exports by Port

Million 480# Bales

US Cotton Exports by Port & Destination, 2010

- **Oakland**: 375,000 Bales, 91% Asia
- **Los Angeles/Long Beach**: 6.9 Mil Bales, >95% Asia
- **New Orleans**: 376,000 Bales, 65% Turkey, 29% L.Amer. excl. Mexico
- **Charleston**: 2.0 Mil Bales, 67% Asia, 27% Turkey
- **Savannah**: 1.7 Mil Bales, 65% Turkey, 21% S. Amer.
- **Houston**: 1.1 Million Bales, 100% Mexico (Hidalgo: 295,800 Bales; Brownsville: 68,100 Bales)

Source: WISERTrade
Panama Canal Importance to U.S. Cotton Exports

- In 2010, 1.34 million bales from Norfolk, Charleston, and Savannah exported to East Asia via Panama Canal (compiled from WISERTrade).
- This represents ~10% of the total U.S. exports.
- Panama Canal cannot handle post-Panamax vessels (12,000 TEUs).
- U.S. cotton exports via the Panama Canal were via smaller Panamax vessels (<5,000 TEUs).

TEU: No. of Twenty-foot Equivalent Unit of Containers.
Background (cont.)

Panama Canal Expansion (PCE) & Costs

• Economies of scale in maritime shipping
  • Currently, 36% of the world containerized fleet is Post-Panamax vessels (up to 12,000 TEU)
  • After PCE, shipping costs per container likely decline 40%

• Cost structure
  • Panamax vessel operational costs of $2,314/TEU (4,000 TEU)
  • Post-Panamax vessel operational costs of $1,449/TEU (10,000 TEU)
Background (cont.)

Panama Canal Expansion

- Transit times vs. PCE Cost Savings
  - The East Coast to China (Shanghai port) route via the Panama Canal (all-water) is 7-8 transit days longer than the Intermodal Option (West Coast ports then rail to East Coast)
  - Intermodal Option across US is more efficient time-wise
  - But, the all-water route from the East Coast is about $490/TEU cheaper than the Intermodal Option
  - This cost differential corresponds to a savings of $70/TEU/day ($490/TEU/7 days)
  - PCE will reduce maritime costs at least $210/TEU for the East Coast ports to China
Background (cont.)

Panama Canal Expansion

- Panama Canal Expansion & Toll Charges
  - Recent toll increases captured 30% of the potential savings of the expansion or $70/TEU of $210/TEU
  - PCE will reduce maritime costs for shipments from the Gulf & South Atlantic ports to China by $140/TEU
Panama Canal Expansion (PCE): $5.25 Billion Project Completed by 2014

- PCE Will More than Double Average Vessel Size Passing thru the Canal by Adding a Third Shipping Lane
- Congestion Led to Expansion Project
- 97% of New Vessel Orders Are Post-Panamax Size
Comparison between Panamax and Post-Panamax Container Vessels

Source: ACP Report

<table>
<thead>
<tr>
<th>Built</th>
<th>Name</th>
<th>Length</th>
<th>Beam</th>
<th>Maximum TEU</th>
<th>Max Draft</th>
<th>Deadweight Tons</th>
<th>US Ports Called at</th>
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<tbody>
<tr>
<td>2006</td>
<td>Emma Mærsk</td>
<td>1300'</td>
<td>180'</td>
<td>&gt;11,000</td>
<td>51'</td>
<td>156,907</td>
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<td>Gudrun Mærsk</td>
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<td>115,700</td>
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<td>2006</td>
<td>Xin Los Angeles</td>
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<td>150'</td>
<td>9,600</td>
<td>48'</td>
<td>112,488</td>
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<td>2006</td>
<td>COSCO Guangzhou</td>
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<td>140'</td>
<td>9,450</td>
<td>46'</td>
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<td>2006</td>
<td>CMA CGM Medea</td>
<td>1150'</td>
<td>140'</td>
<td>9,415</td>
<td>48'</td>
<td>113,964</td>
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<tr>
<td>2003</td>
<td>Axel Mærsk</td>
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<td>140'</td>
<td>9,310</td>
<td>44'</td>
<td>109,000</td>
<td>None</td>
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<tr>
<td>2006</td>
<td>NYK Vega</td>
<td>1100'</td>
<td>150'</td>
<td>9,200</td>
<td>48'</td>
<td>94,000</td>
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<tr>
<td>2005</td>
<td>MSC Pamela</td>
<td>1100'</td>
<td>150'</td>
<td>9,178</td>
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<td>107,849</td>
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<tr>
<td>2006</td>
<td>MSC Madeleine</td>
<td>1140'</td>
<td>140'</td>
<td>9,100</td>
<td>48'</td>
<td>108,637</td>
<td>Los Angeles</td>
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<tr>
<td>2006</td>
<td>Hannover Bridge</td>
<td>1100'</td>
<td>150'</td>
<td>9,040</td>
<td>47'</td>
<td>99,214</td>
<td>None</td>
</tr>
</tbody>
</table>

Source: Lloyd’s Register, News Release (2006)
Emma Maersk
15,000 TEU

Current Operations
4,500 TEU – 5,000 TEU
What We Did & Why

- Assess Impacts of the Panama Canal Expansion on U.S. Cotton Exports by Port
- Evaluate PCE Impacts on U.S. Cotton Export Flows, Export Levels, Prices & Revenues
- PCE is Underway & Will Be Completed by Mid - 2014
- PCE Will Shape Future Competitive Position of US Cotton Production & Exports
- Maximize (Whse Revenue) – (T Costs)
Scope of the Spatial Price Equilibrium Model

- 416 excess supply regions and 25 excess demand regions.
- 410 US excess supply regions (warehouses)
- 6 foreign regions (Australia, Brazil, India, Sub-Saharan Africa, Uzbekistan & other exporters)
- 11 US excess demand regions (domestic mills)
- 14 foreign excess demand regions (Bangladesh, China, EU-27, Hong Kong, Indonesia, Japan, Mexico, Pakistan, South Korea, Taiwan, Thailand, Turkey, Vietnam & other importers)
- US cotton transportation network connects excess supply regions with excess demand regions & ports via truck & rail
- 15 U.S. cotton exporting ports and 5 intermodal (rail loading) sites
Data and Parameters

- Estimated excess demand and supply equations; cotton handling and storage costs; and railroad, truck, ocean freight rates
- In the US model, excess supply regions are warehouses which are optimal solution to the least cost shipping model developed by Fraire et al. (2010)
- Truck and rail rates were based on estimates from Fraire et al. (2010)
- Ocean freight rate estimates were proxies of the difference between import price (CIF) and export price (FOB) for each pair of trading partners
Results

28% Reduction in Ocean Freight rates Due to PCE

• Panama Canal expansion is expected to increase cotton exports via the Panama Canal
• U.S. Gulf and Atlantic ports should increase exports
• Pacific Coast ports, however, would experience a reduction in exports
# Model Validation & Results for 28% Reduction in Ocean Freight, Gulf & S. Atlantic Ports

<table>
<thead>
<tr>
<th>Port</th>
<th>Validation</th>
<th>Results</th>
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<tbody>
<tr>
<td></td>
<td>Avg (2007-09)</td>
<td>Estimated Base Model</td>
</tr>
<tr>
<td>LA - LB</td>
<td>6,289.1</td>
<td>6,163.3</td>
</tr>
<tr>
<td>Savannah</td>
<td>2,231.4</td>
<td>2,236.7</td>
</tr>
<tr>
<td>Houston</td>
<td>1,609.7</td>
<td>1,551.8</td>
</tr>
<tr>
<td>Laredo - El Paso</td>
<td>989.3</td>
<td>1,141.3</td>
</tr>
<tr>
<td>New Orleans</td>
<td>529.5</td>
<td>514.7</td>
</tr>
<tr>
<td>Oakland</td>
<td>480.6</td>
<td>343.8</td>
</tr>
<tr>
<td>Charleston</td>
<td>479.9</td>
<td>338.3</td>
</tr>
<tr>
<td>Hidalgo - Bvl</td>
<td>373.7</td>
<td>340.6</td>
</tr>
<tr>
<td>Norfolk</td>
<td>273.1</td>
<td>282.2</td>
</tr>
<tr>
<td>Gulfport</td>
<td>107.0</td>
<td>45.3</td>
</tr>
<tr>
<td>Mobile</td>
<td>30.7</td>
<td>72.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>13,643.7</strong></td>
<td><strong>13,030.8</strong></td>
</tr>
</tbody>
</table>
Warehouse Revenue Change Attributed to 28% Reduction in Ocean Freight, Gulf & S. Atlantic Ports

Scenario 2
Change in Producer Revenue ($)  
-1,073,729 - $500,000  
-499,999 - 0  
1 - 2,500,000  
2,500,001 - 5,000,000  
5,000,001 - 7,500,000  
7,500,001 - 10,000,000  
10,000,001 - 15,000,000  
15,000,001 - 20,000,000  
20,000,001 - 30,000,000  
30,000,001 - 37,834,528
<table>
<thead>
<tr>
<th>State</th>
<th>Revenue ($ Million)</th>
<th>Price ($/480 lb Bale)</th>
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<tbody>
<tr>
<td>Texas</td>
<td>$85.73</td>
<td>$11.42</td>
</tr>
<tr>
<td>Georgia</td>
<td>$44.46</td>
<td>$21.03</td>
</tr>
<tr>
<td>Tennessee</td>
<td>$42.31</td>
<td>$19.68</td>
</tr>
<tr>
<td>Arkansas</td>
<td>$30.04</td>
<td>$18.36</td>
</tr>
<tr>
<td>Mississippi</td>
<td>$21.78</td>
<td>$18.99</td>
</tr>
<tr>
<td>North Carolina</td>
<td>$23.84</td>
<td>$21.78</td>
</tr>
<tr>
<td>Missouri</td>
<td>$13.61</td>
<td>$17.32</td>
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<tr>
<td>South Carolina</td>
<td>$11.29</td>
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<td>Louisiana</td>
<td>$8.83</td>
<td>$18.82</td>
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<td>Alabama</td>
<td>$8.79</td>
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<td>Virginia</td>
<td>$4.64</td>
<td>$21.89</td>
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<tr>
<td>Florida</td>
<td>$1.58</td>
<td>$20.69</td>
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<tr>
<td>New Mexico</td>
<td>$0.78</td>
<td>$16.26</td>
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<tr>
<td>Kansas</td>
<td>$0.14</td>
<td>$17.27</td>
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<tr>
<td>Oklahoma</td>
<td>$3.12</td>
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<tr>
<td>Arizona</td>
<td>$(0.45)</td>
<td>$(1.00)</td>
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<tr>
<td>California</td>
<td>$(1.14)</td>
<td>$(0.94)</td>
</tr>
<tr>
<td>U.S. Total</td>
<td>$299.36</td>
<td>$16.04</td>
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</table>
Summary

Panama Canal Expansion Will Play Major Role in Future of US Cotton Exports

- Total U.S. cotton Exports Increase by 238,000 Bales, 2%
- Gulf and S. Atlantic Ports Increase Exports by 4.6 Million Bales or 90%
- West Coast Exports Decline by 4.3 Million Bales or 66%
Summary

• Gains in Revenue for Most Cotton Producing States
  • TX, GA, TN & AR Lead Gainers

• CA & AZ Lose Revenue

• Total Revenue Increase, $300 Million
  • $86 Million Gain for Texas
Conclusions

• PCE Could Be Larger than Estimated
• Texas Gains Regardless
• Competitive Position of US Cotton Enhanced
• Gulf & South Atlantic Ports Stand to Gain
  ➢ Constraints: Depth, Land Area & Funding
• Infrastructure Improvement & Gains Follow Port Development
  ✓ Roads, Bridges, Power Supplies, etc.
Implications & Further Research

- Analysis of Larger Reductions in Ocean Freight Rates
- Analyze Impacts on Competing Exporters (Brazil is Underway)
- Evaluate Prices and Revenue at US Mills
Questions?

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