# Impact of the Panama Canal Expansion on Trade Flows and Intermodal Carriers

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Philip Davies
Davies Transportation Consulting Inc.

# Presentation Outline

- Introduction
- Research Objectives
- Impact of Shipping Costs on Cargo Routing
- Panama Canal Expansion Impact on Shipping Costs
- Impact to Class 1 Railways
- Conclusions

# Davies Transportation Consulting Inc.

- Vancouver-based firm providing a broad range of transportation consulting services since 2008.
- Leadership of multidisciplinary teams capable of undertaking large and complex projects encompassing transportation economics, logistics, social impacts, environmental issues and technology.
- Founder Philip Davies has over 30 years experience as a transportation economist.

# Previous Research

- Previous research includes five papers published since 2009 on the impact of costs and macroeconomic factors on West Coast port traffic.

- This presentation builds on previous research to analyze the potential impacts of the Panama Canal expansion.

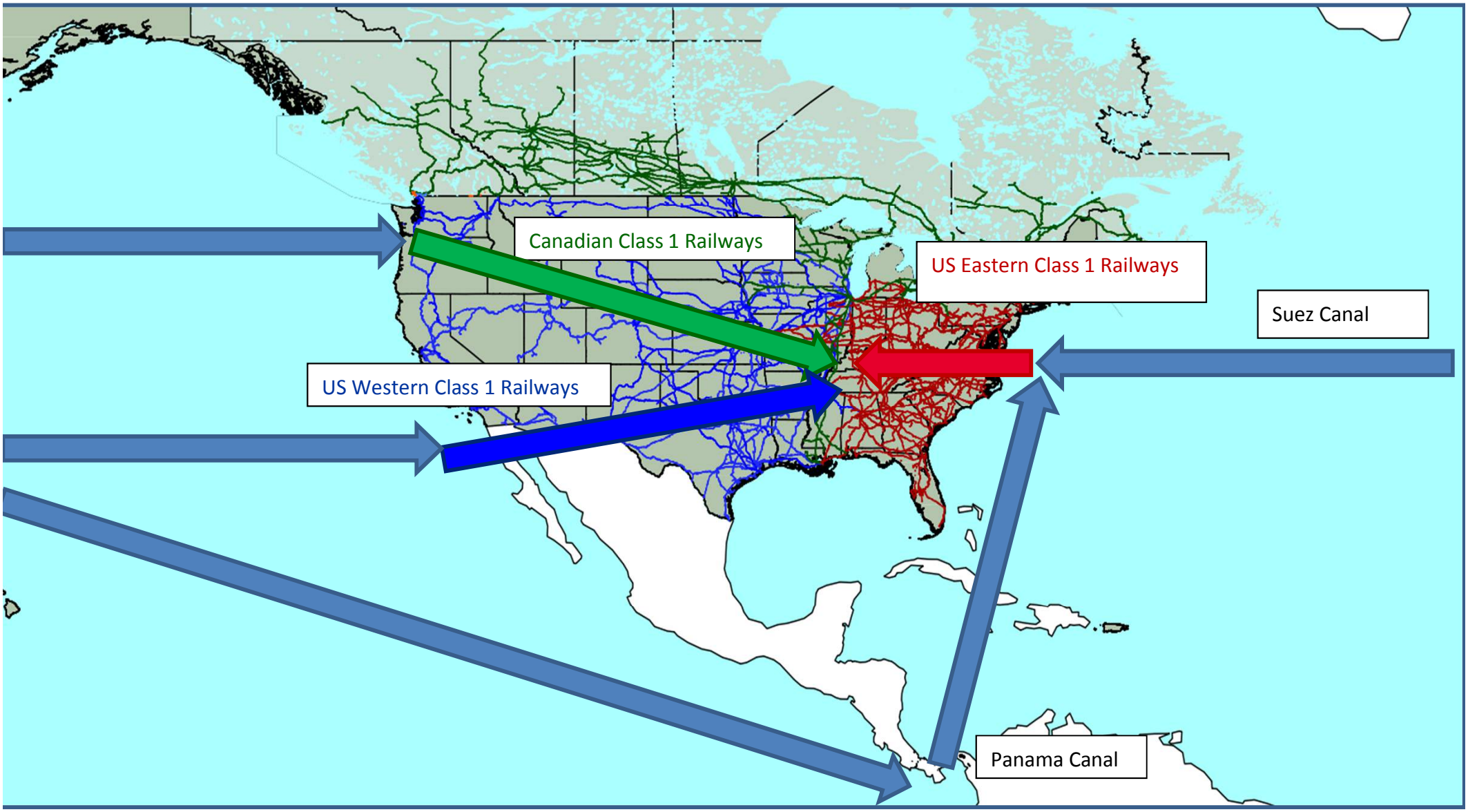
# Research Issues

- How will changes in relative costs affect the routing of cargo?
- How significant will the change in vessel size be for shipping costs via the Panama Canal?
- What will be the impact on the major Class 1 railways?

# Research Approach

- Data-driven estimation of cargo flow impacts
- Analysis of Panama Canal Authority estimates of cost savings.
- Analysis of Class 1 Railway pricing options, intermodal volumes and revenue.

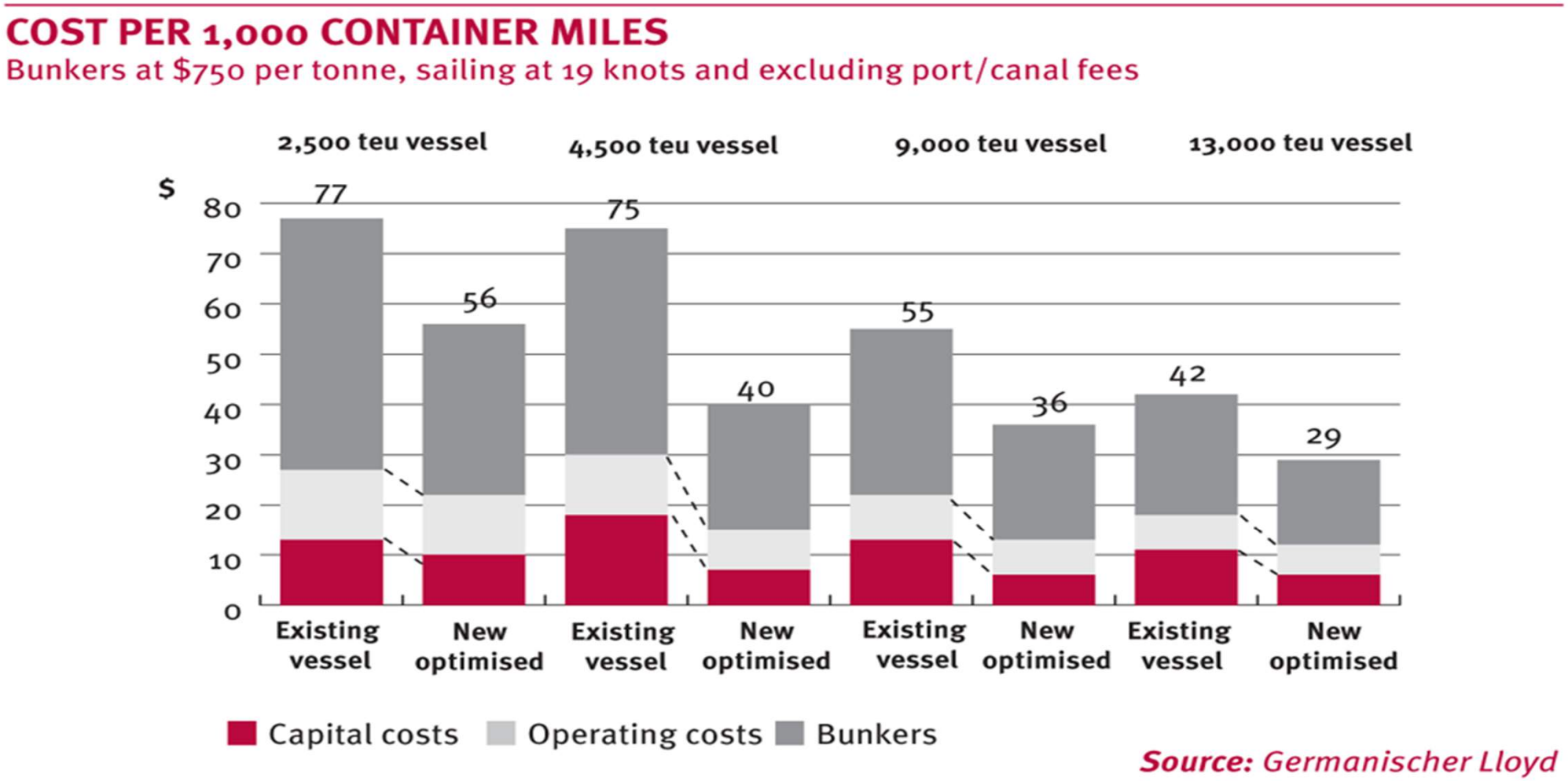
# Trade Routes for Asian Imports



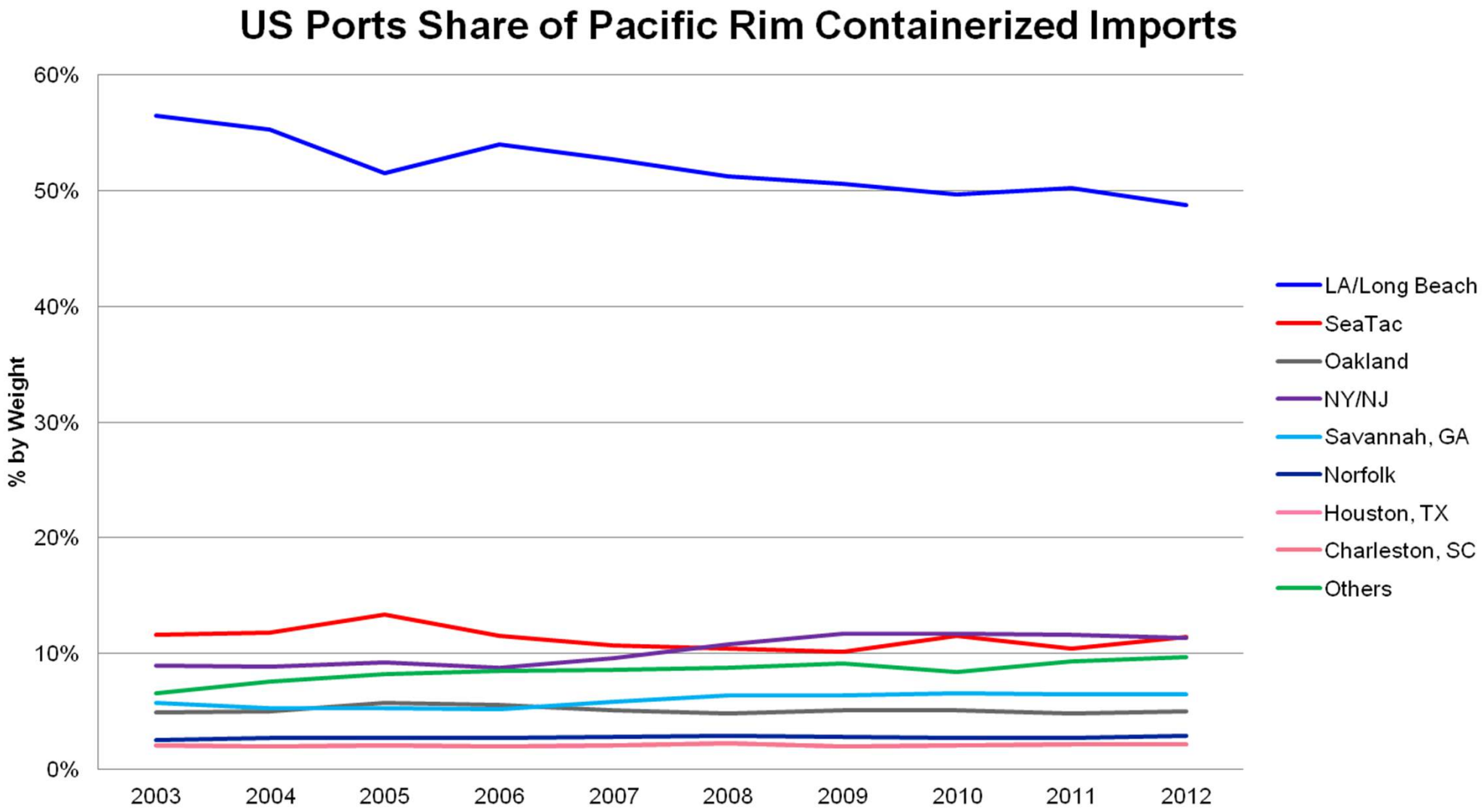
# Panama Canal Expansion

- Expansion of locks and navigational channels to accommodate larger vessels.
- Maximum container vessel size to increase from 4,500 TEU's to 13,000 TEU's on completion in 2015.
- Current average vessel size on Transpacific trade lane = 6490 TEU's. (Drewry, June 2013)

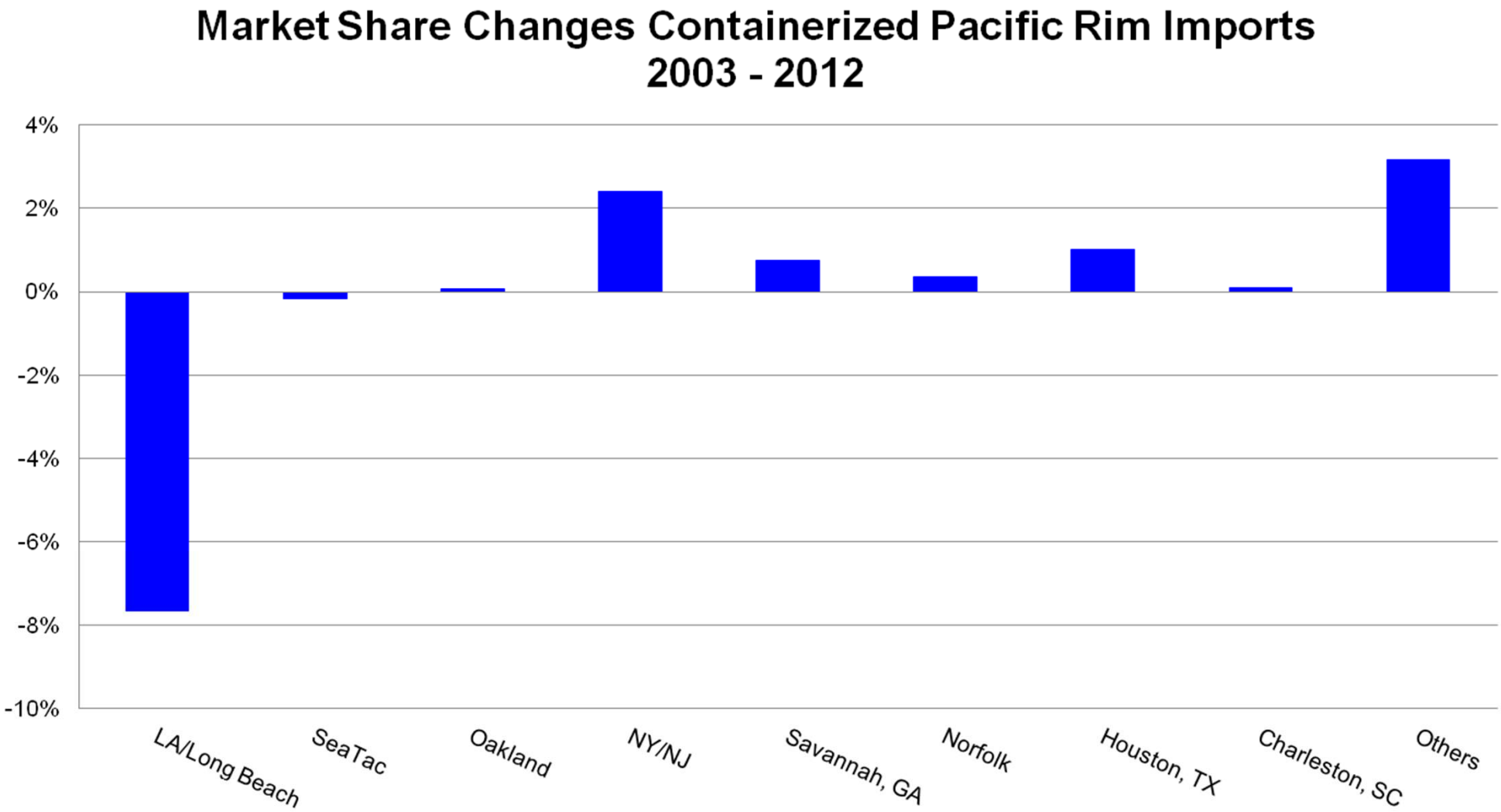
# Why does this matter? Technological Change and Economies of Scale



# Major Container Ports Share of Asian Imports 2003 – 2012



# Changes in Port Market Shares 2003 – 2012

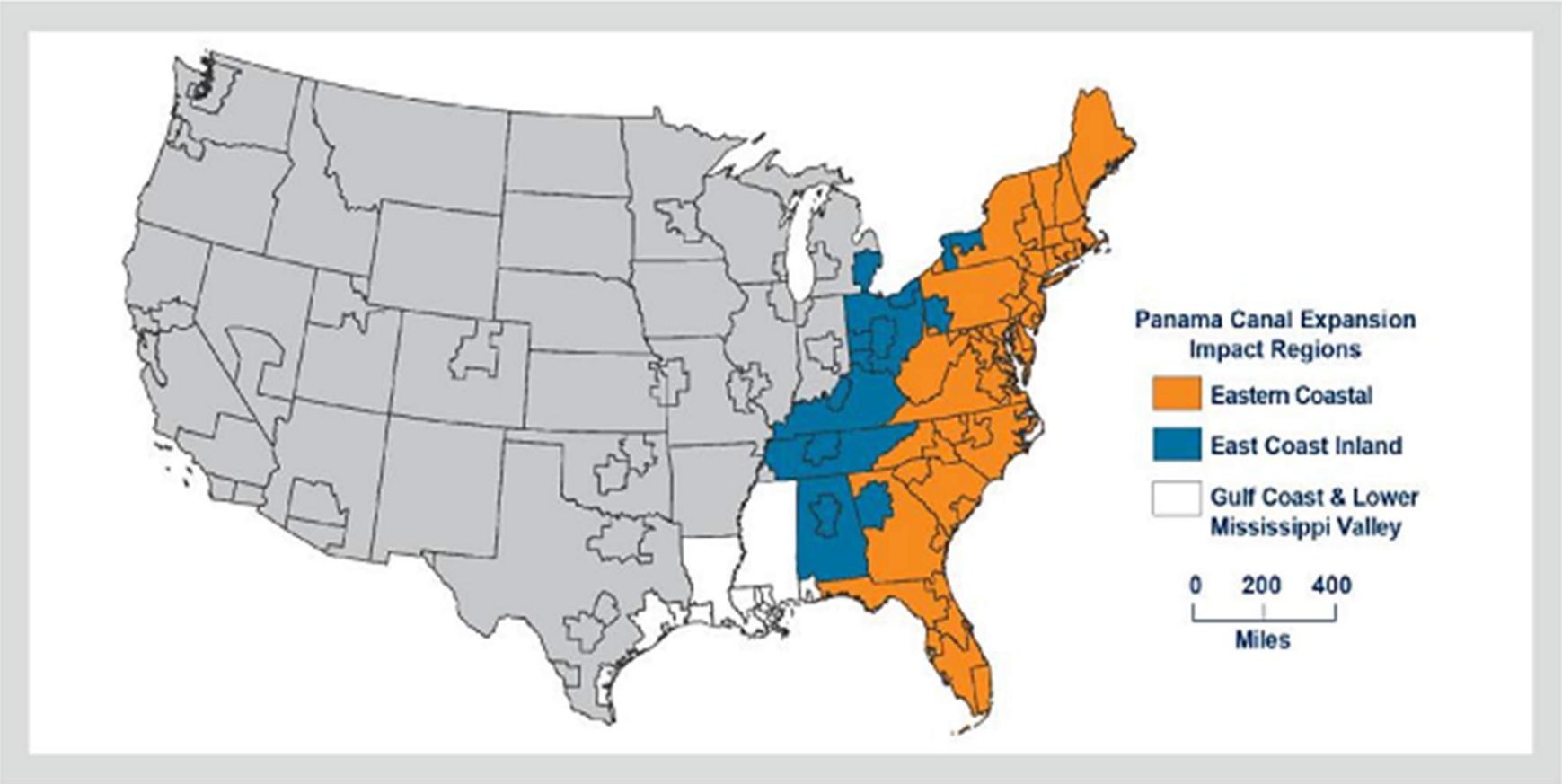


# Estimation of Elasticity – Asian Imports through the Ports of LA and Long Beach

- Elasticity is (% Change in Volume)/(% Change in Price).
- Focus on Midwest – Atlantic Region market (Chicago to New York).
- Shipper costs based on Leachman Phase 2 study (2010).
- Changes in cost components – rates and surcharges.

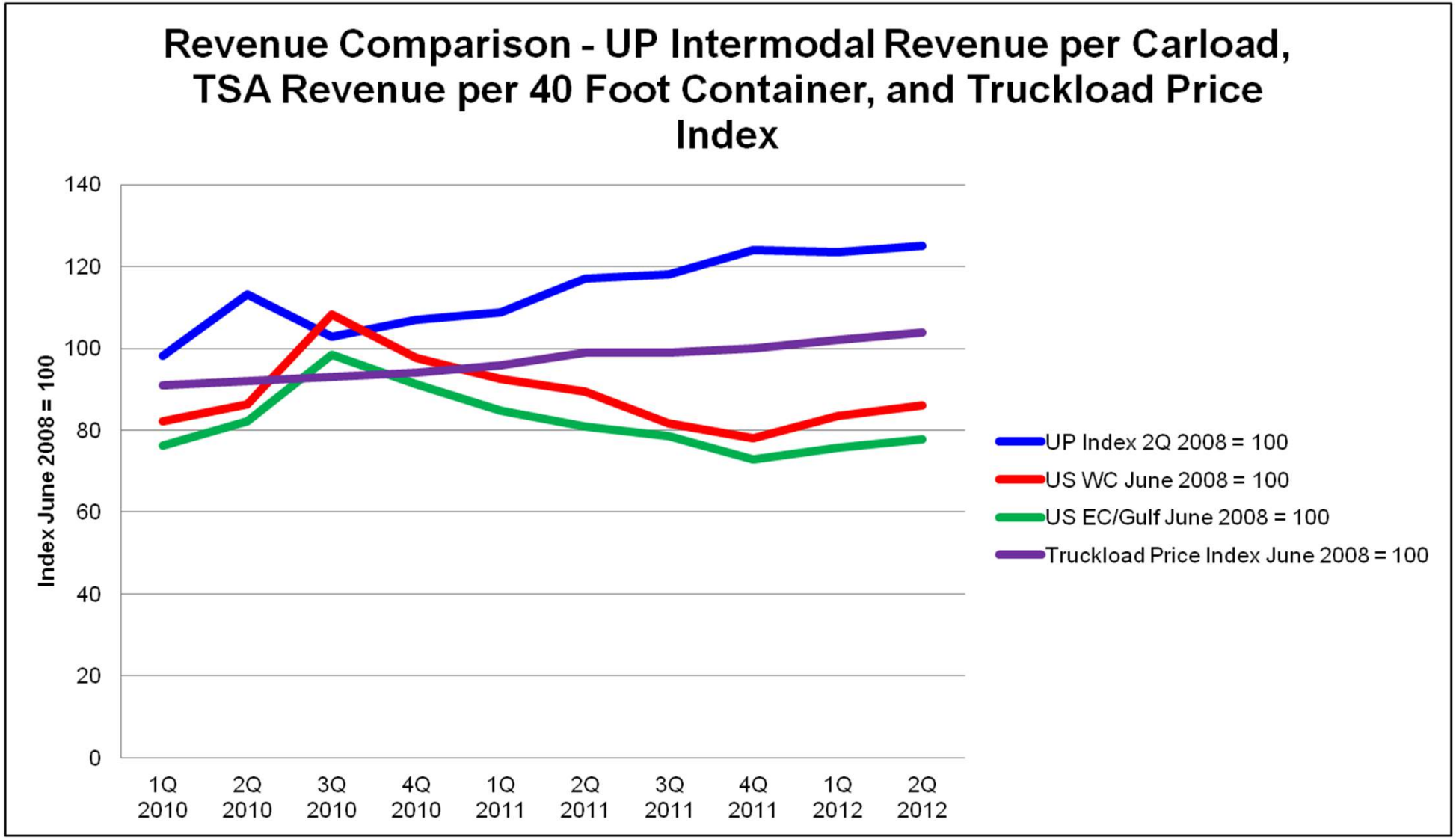
# Regions Affected by Panama Canal Expansion

*Figure ES – 1.* **U.S. REGIONS AFFECTED BY PANAMA CANAL EXPANSION – CONTAINER TRADES**




*Source: Parsons Brinckerhoff, Panama Canal Expansion Study, June 2012*

# Transportation Cost Changes 2007 - 2012

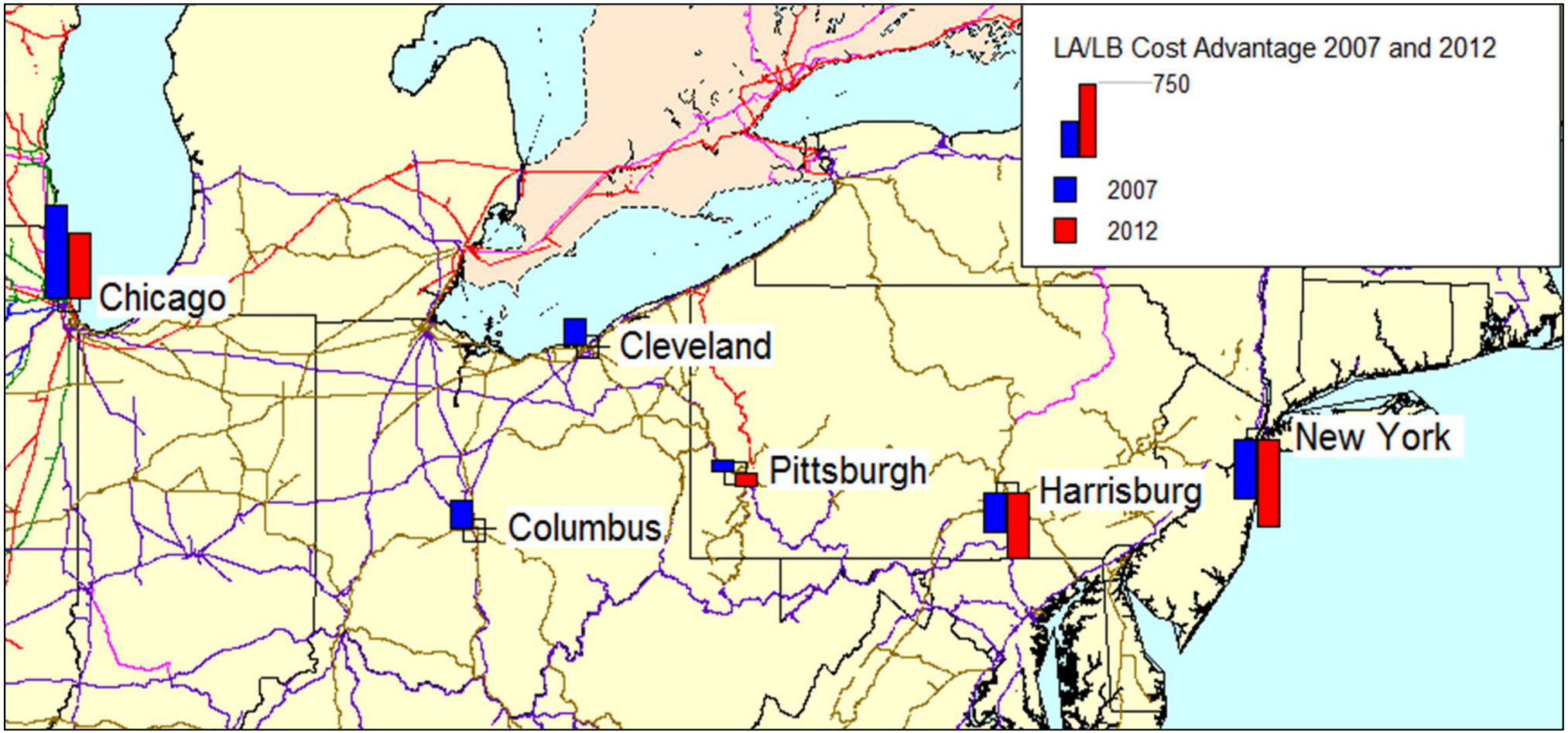


# Changes in Transportation Costs 2007 – 2012

| Chicago and New York Container Costs 2007 and 2012 | | | | | | |
|---|---|---|---|---|---|---|
| **2007 Estimates ($ per FEU)** | | | | | | |
| **Destination** | **Port** | **Estimated Ocean Costs** | **Bunker Surcharge** | **Direct Rail Costs Net of Surcharges** | **Inland Surcharge** | **Total Transportation Costs** |
| Chicago | LA/Long Beach | $1,660 | $635 | $998 | $299 | $3,593 |
| Chicago | NY-NJ | $2,817 | $635 | $679 | $204 | $4,335 |
| **2012 Estimates ($ per FEU)** | | | | | | |
| **Destination** | **Port** | **Estimated Ocean Costs** | **Bunker Surcharge** | **Direct Rail Costs Net of Surcharges** | **Inland Surcharge** | **Total Transportation Costs** |
| Chicago | LA/Long Beach | $1,420 | $510 | $1,194 | $351 | $3,475 |
| Chicago | NY/NJ | $2,155 | $999 | $667 | $179 | $4,001 |
| Inland rail costs NY-NJ to Chicago based on NS avg rev per carload 2008 & 2012 | | | | | | |
| **Change 2007 - 2012** | | | | | | |
| Chicago | LA/Long Beach | -$240 | -$125 | $196 | $52 | -$117 |
| Chicago | NY-NJ | -$662 | $364 | -$12 | -$25 | -$334 |

**Net change in LA/LB costs relative to NY/NJ: $217 per FEU**

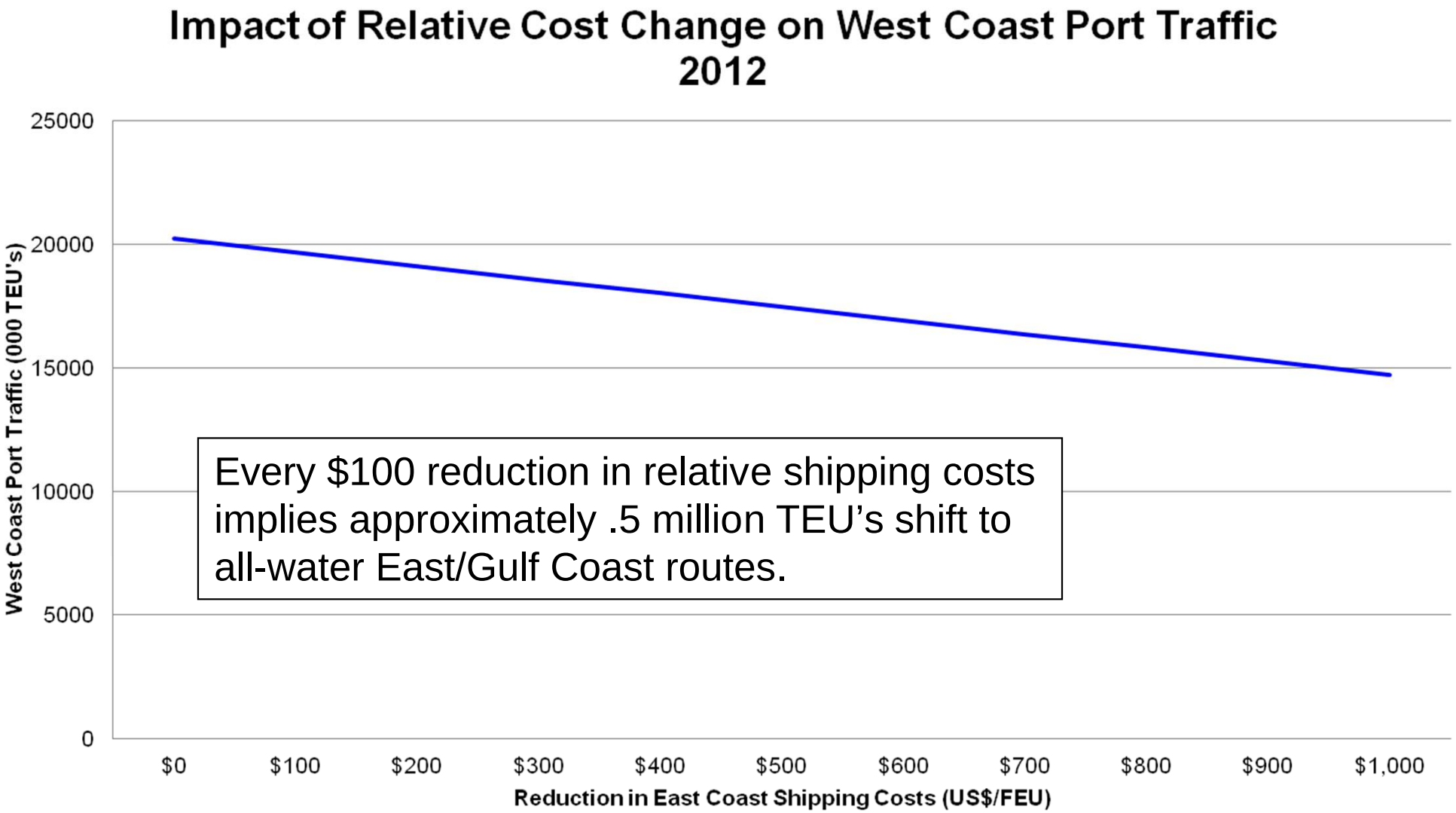
# Transportation Cost Advantage LA/LB 2007 vs 2012



# Estimated Elasticity 2007 – 2012

- Change in West Coast market share of imports from Pacific Rim: 5.5% (2007: 70.2%; 2012: 66.5%).
- Change in relative shipping costs (LA/LB vs. New York): 6.0% or $217 per FEU.
- Estimated elasticity West Coast traffic = .92
- Impact on cargo routing: 1.1 million TEU's shifted to East/Gulf Coast ports.
- **Conclusion: changes in relative shipping cost do matter**

# Impacts of Relative Cost Change

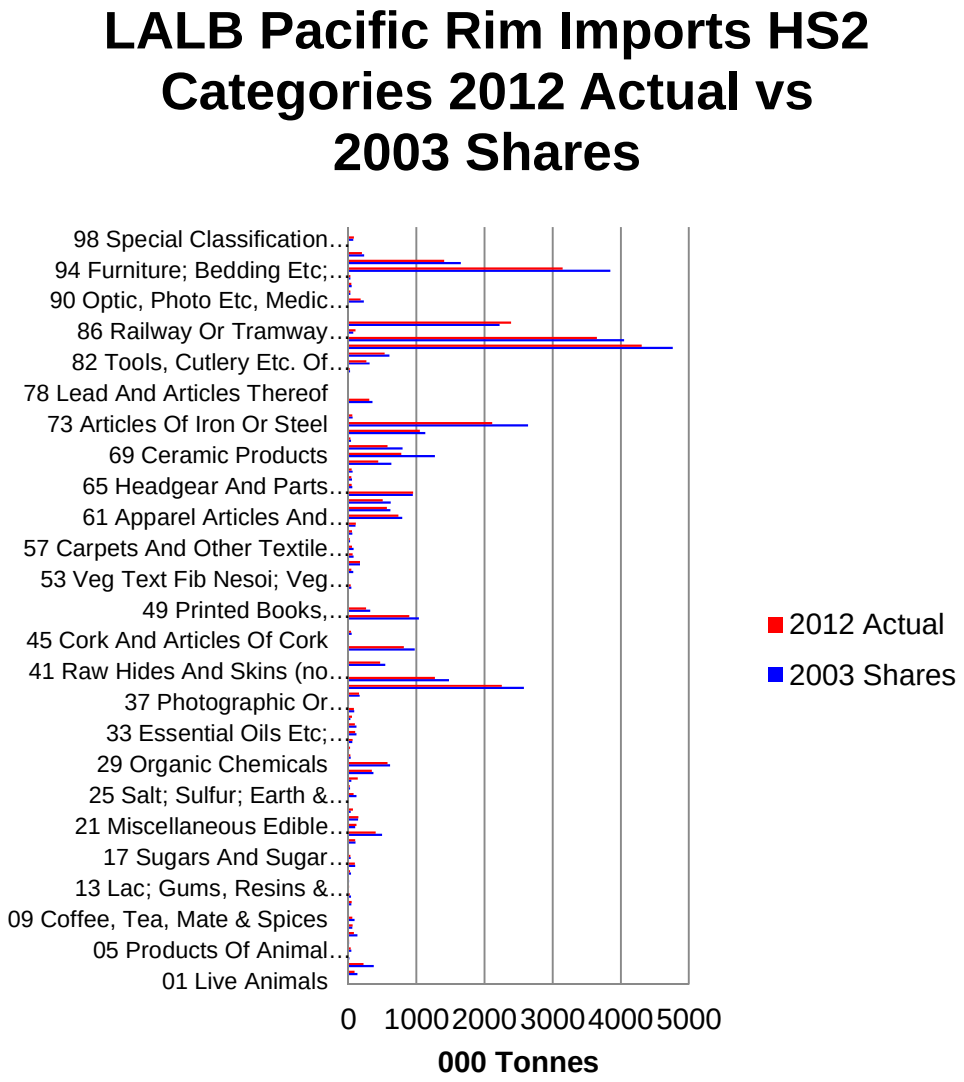



Every $100 reduction in relative shipping costs implies approximately .5 million TEU's shift to all-water East/Gulf Coast routes.

# Impact of Shipper Costs on Cargo Routing: MARAD Phase 1

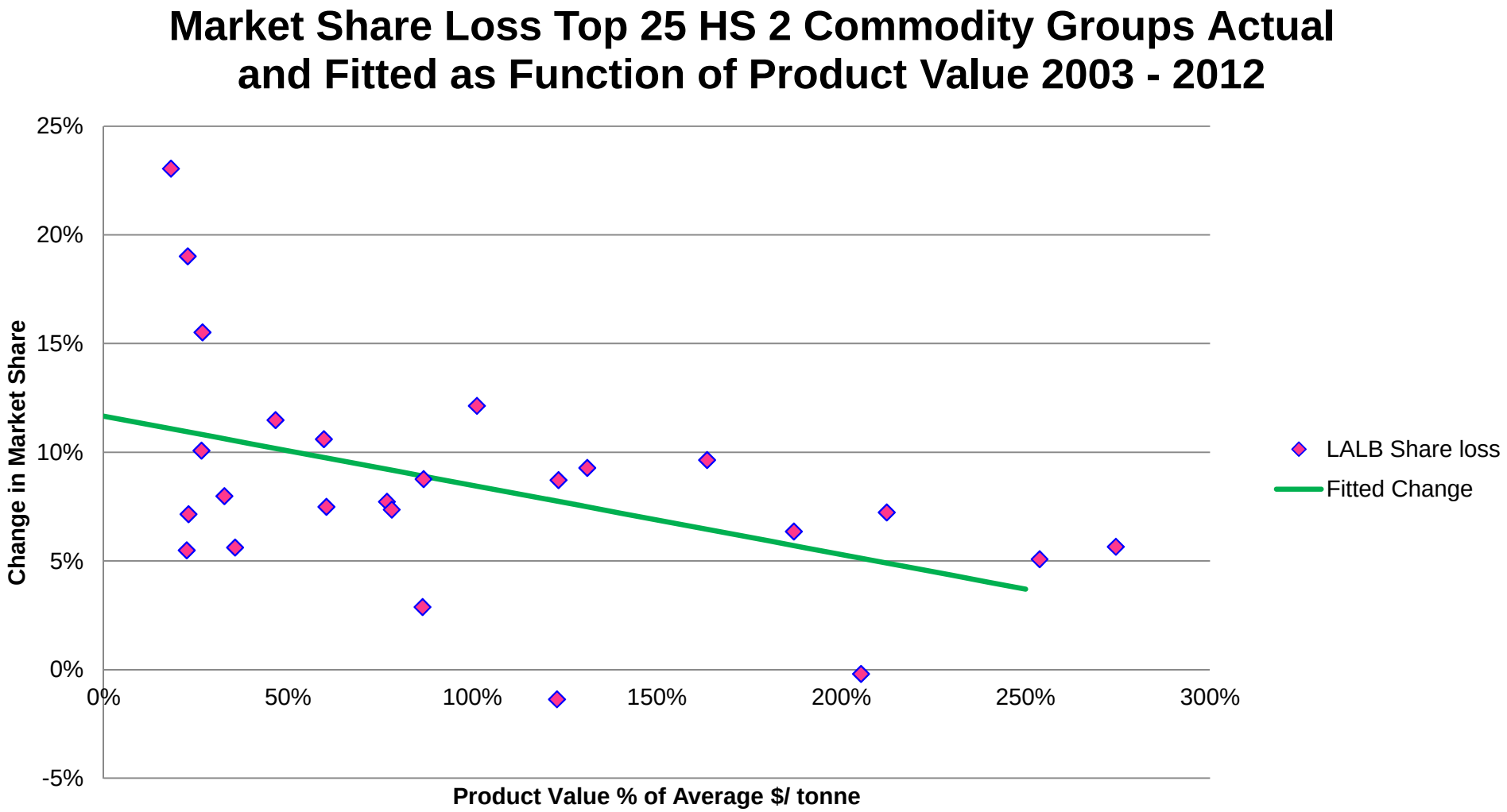
- MARAD: “The ways that shippers will respond to cost savings are an important factor in determining the impacts of Panama Canal expansion on U.S. ports.”
- “Three factors are generally considered to be the prime determinants of how goods are moved: reliability, transit time, and transportation costs.”
- “… high-value products tend to be moved through U.S. West Coast ports to inland regions.”

# Is routing of high value goods less elastic to costs?



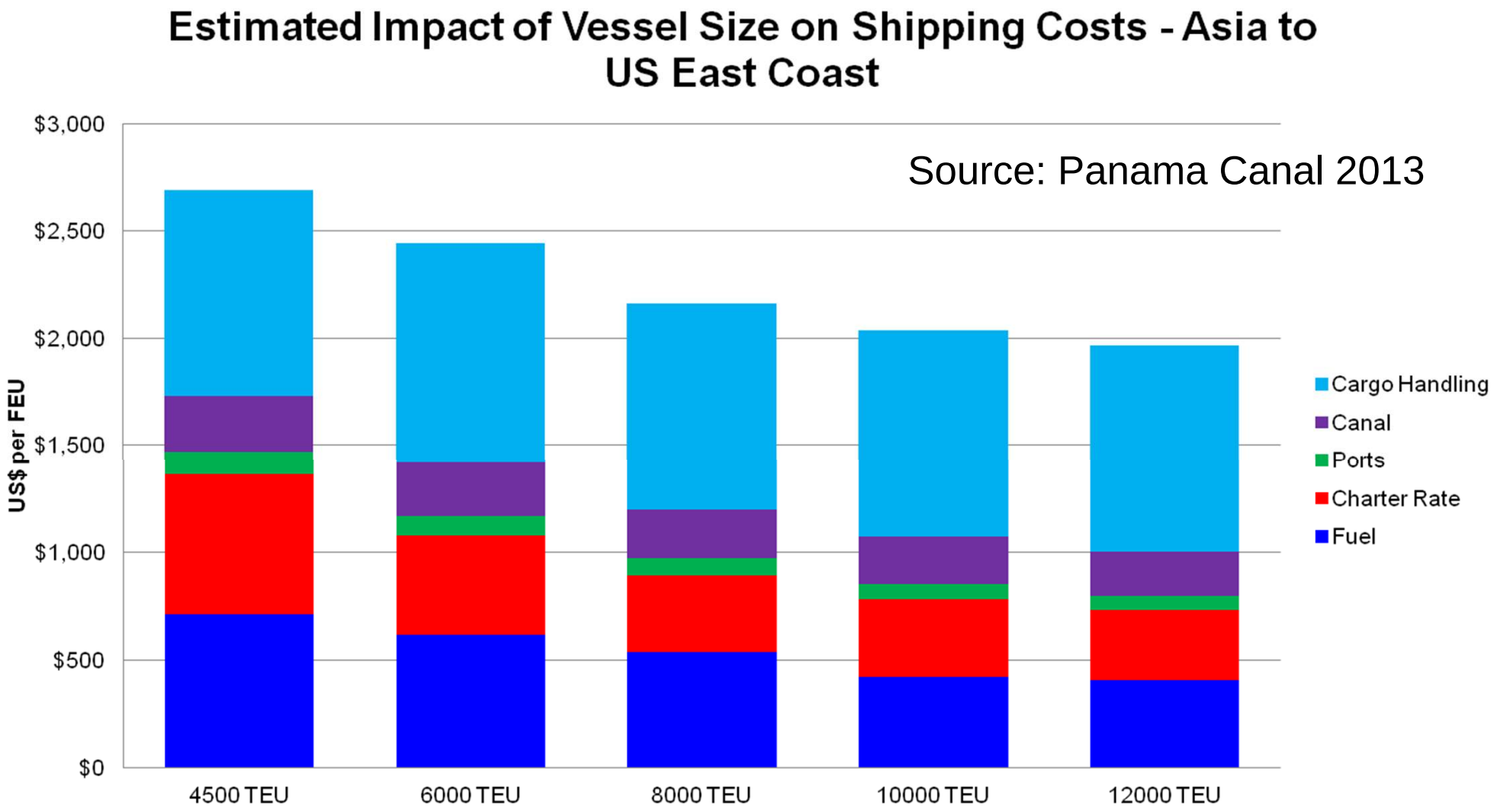

- Analysis of market shares for Ports of LA/Long Beach 2003-2012.
- Market share increase: HS87 Auto Parts.
- Market share stable: HS 64 Footwear.
- All others declined.

# Impact of Product Value on LA/LB Market Share




**Conclusion: Product value alone is not a good predictor of routing shifts.**

# Panama Canal Authority - Impacts of Vessel Size on Liner Costs



# Cost Reduction Estimate – 4,500 TEU Vessel vs 8,000 TEU Vessel

- Based on Panama Canal Authority estimates.
- Adjusted for vessel utilization and bunker prices.
- Estimated cost reduction: $404 per FEU.

# Impact to West Coast Ports from Expanded Panama Canal

- Assume all savings passed on to shippers
- Cost reduction for East Coast routing of $404 per FEU or 11.6%
- Based on elasticity of .92, reduction of West Coast market share of 10.7%.
- 2012 West Coast volume would decline from 20.2 million TEU's to 18.0 million TEU's.

# Actual Change in Relative Costs will Depend on:

- Size of vessels on competing routes
- Bunker prices
- Panama and Suez Canal tolls
- Pricing response from US West Coast railways and ports
- Inventory holding costs
- Readiness of East Coast ports and supporting infrastructure

# Impacts on Class 1 Railways

- Western Class 1 Railways: BNSF and UP
- Eastern Class 1 Railways: NS and CSX
- Canadian Class 1 Railways: CN and CP

# Impact on Western Class 1 Railways

- Total intermodal carloads 2012 = 8 million.
- Port-related cargo includes international and transloaded domestic traffic.
- UP international traffic 54%; BNSF 49% (2012).
- Transloaded traffic LA/LB = 19% of imports
  - 1.9 million TEU's or ~ 0.6 million 53 ft containers
  - 8% of total intermodal traffic (16% round trip).
- Conservative estimate: 70% of Western Class 1 intermodal traffic is port-related.

# Impact on Western Class 1 Railways

- Assume all Panama savings passed on to shippers ($404 per FEU).
- Based on elasticity estimate, 447,000 carloads or 7.5% of total Western intermodal traffic would shift to East/Gulf Coasts.
- Unlikely that western railways will lower prices to maintain market share; would require a discount of 31% on average intermodal rates for contested volumes.

# Impact on Eastern Class 1 Railways

- Revenue from West Coast routing depends on:
  - Volume of traffic interlined with Western Class 1 Railways.
  - Rate division.
- Revenue from East Coast routing depends on:
  - Rail share of port traffic.
  - Rates (competitive with trucking).

# Eastern Class 1 Railways

- Traditional Eastern Class 1 Strategy: “CSX Transportation CEO Michael Ward said he would prefer West Coast port growth to East Coast port expansion, because shipments from the West would less likely be diverted to trucks.” (JOC May 24, 2012)

# Eastern Class 1 Railways Truck Competitiveness Improving

- Major investments by NS and CSX to improve intermodal corridor linkages from East Coast ports.
- Double stack on improved corridors.
- Fuel prices increasing – favours rail transportation.
- Trucking Hours of Service changes.

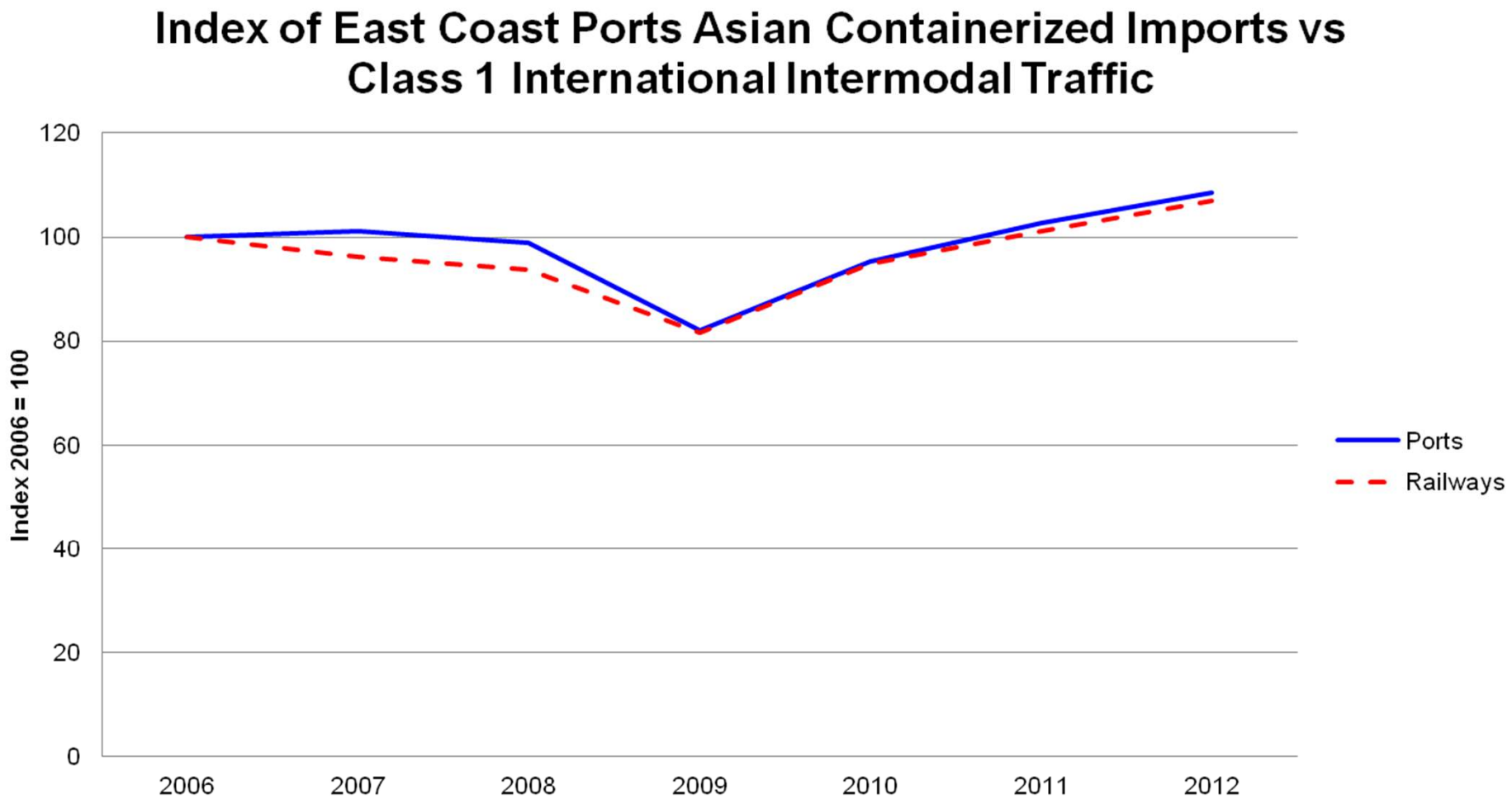
# Possible Eastern Class 1 Rail Strategy

- Negotiate increased rate division on West Coast traffic – win/win.
- Increase revenue on West Coast traffic.
- Drive traffic to East Coast ports for westbound shipment via improved intermodal rail corridors.
- Success depends on ability to compete with trucks for port traffic.

# Rail Share of East Coast Port Traffic

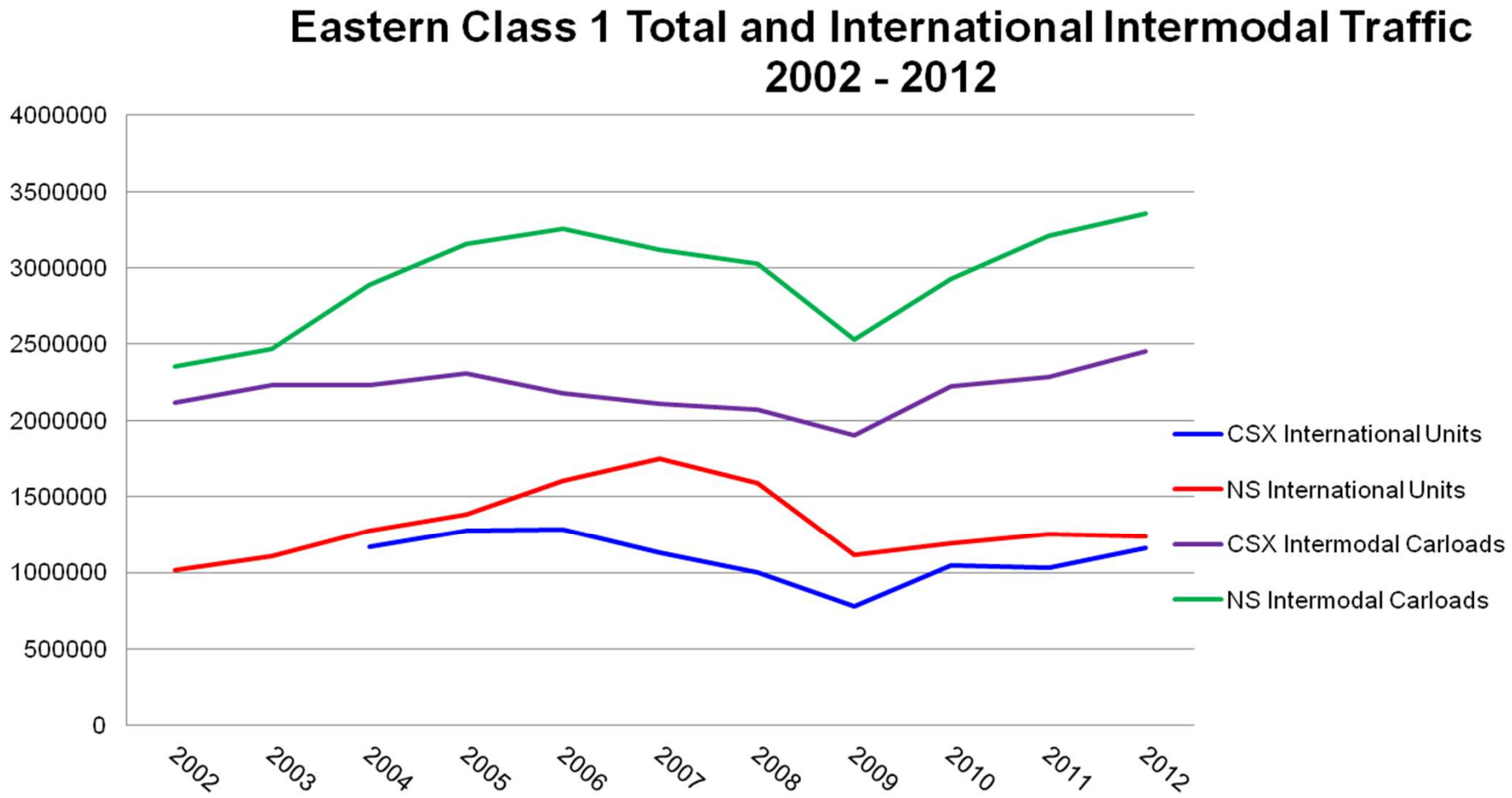
- MARAD: “In 2010, 75 percent of container cargo tonnage imported from Northeast Asia through East Coast and Gulf ports was moved by truck to inland destinations.”
- Port of NY/NJ: 14% rail in 2005; 13% rail in 2010.
- Port of Virginia 32% rail in 2012.
- Port of Savannah 20% rail in 2012.

# Rail Share of East Coast Port Traffic



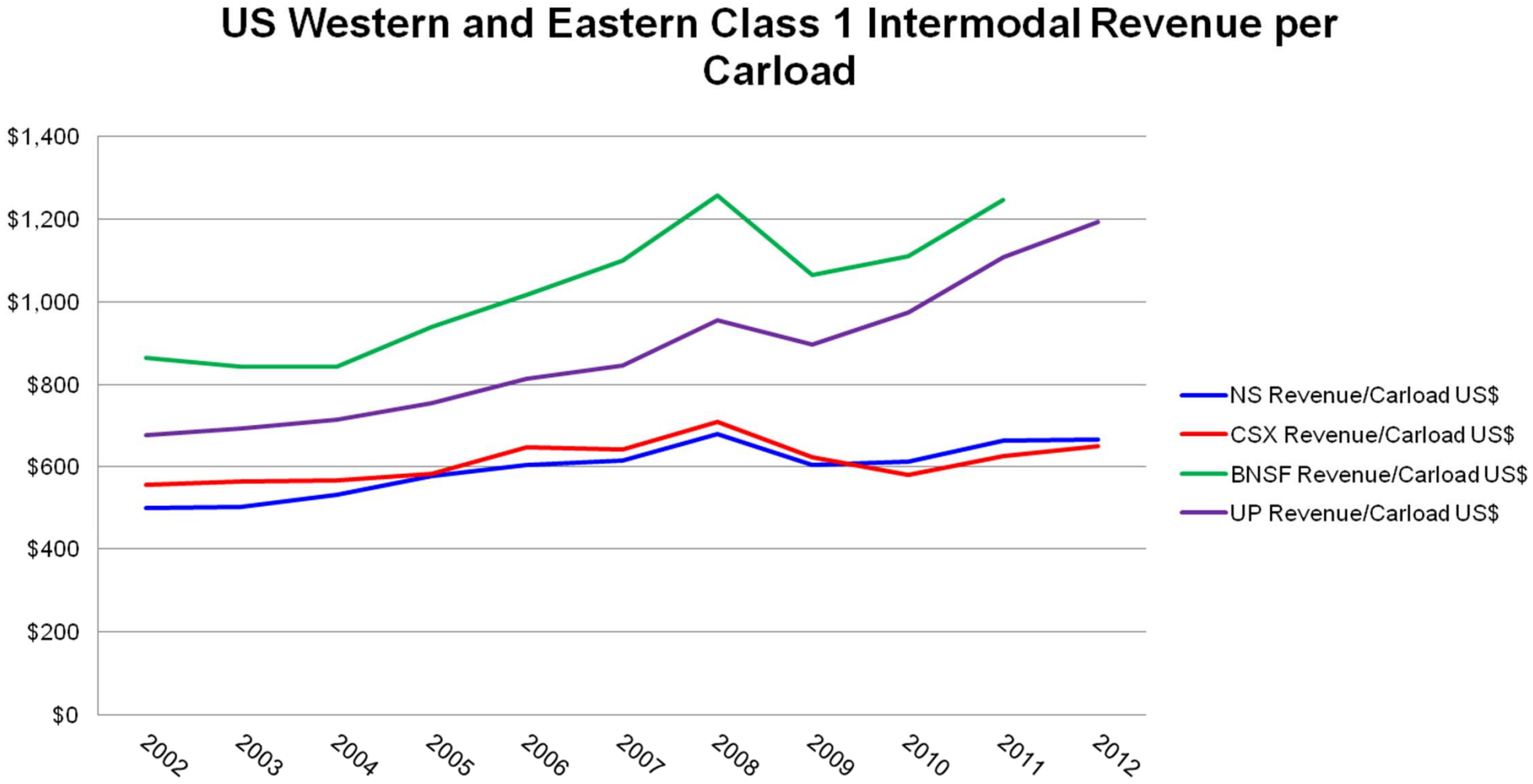

Eastern Class 1 international intermodal traffic has not increased faster than port traffic.

# Eastern Class 1 Intermodal Trends




To date growth has occurred primarily in domestic intermodal traffic.

# Pricing Power: Western vs Eastern Class 1 Revenue per Carload




Eastern Class 1 pricing will remain constrained by trucking competition.

# Impact on Eastern Class 1 Rails: Neutral to Positive

- Eastern railways could gain market share in the East Coast Inland region due to length of haul and improved service on key routes – Heartland Corridor for NS and National Gateway Initiative for CSX.
- Rates will continue to be constrained by truck competition.
- Could have a positive impact on revenue split for port-related traffic from West Coast.

# Impact on Canadian West Coast Ports and Class 1 Railways

- Canadian Class 1 Railways highly dependent on Canadian market.
- US transhipments of Asian imports only 15% of Canadian Class 1 intermodal traffic.
- Minimal impact on Canadian Class 1 railways from Panama Canal expansion anticipated.

# Conclusions

- **Reduction in the relative shipping costs does matter**
  - A $100 reduction would shift 534,000 TEU's to US East Coast/Gulf.
- **However, there are a number of potentially mitigating factors including:**
  - Size of vessels servicing USWC and Suez
  - Readiness of East Coast ports and supporting inland infrastructure
  - Response from western rail carriers, USWC ports
  - Inventory holding costs
  - Transshipments may reduce cost reductions
  - Ability of ocean carriers to retain some of the cost savings.

# Conclusions

- Western Class 1 Railways
  - Neutral is likely best case scenario.
- Eastern Class 1 Railways
  - Could be positive impact.
- Canadian Class 1 Railways
  - Minimal impact.

# Research Limitations for this Presentation

- Analysis of the impact of changes in relative shipping costs for West Coast vs East Coast cargo routings for Asian imports based on 2012 results.
- Does not forecast or estimate the impact of increased vessel size on shipping costs via West Coast or Suez Canal routes.
- Does not consider existing port, terminal or inland network limitations.
- Does not consider the impact of growth or changes in origin-destination patterns.

# Impact of the Panama Canal Expansion on Trade Flows and Intermodal Carriers

Philip Davies
Principal
Davies Transportation Consulting Inc.
802 – 1790 Bayshore Drive
Vancouver BC
Email: pdavies@dtci.ca
Phone: 604 764-9303
Website: dtci.ca