Freight and Logistics Trends to Watch

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Transportation Planning and Policy is a priority at Local, Regional, National, International scales

The National Academies of SCIENCES • ENGINEERING • MEDICINE engaged in Critical Transportation Issues

- Making systems safe and secure
- Achieving a state of good repair
- Automation/technology/innovation
- Efficient Freight/Goods movement

- Resilience/Climate Change/Clean energy
- Economic development/growth
- Reliability/Congestion relief
- Equity issues
- Governance Issues

https://www.nap.edu/catalog/25314/critical-issues-in-transportation-2019

Three freight connections

1. International freight becomes domestic freight;

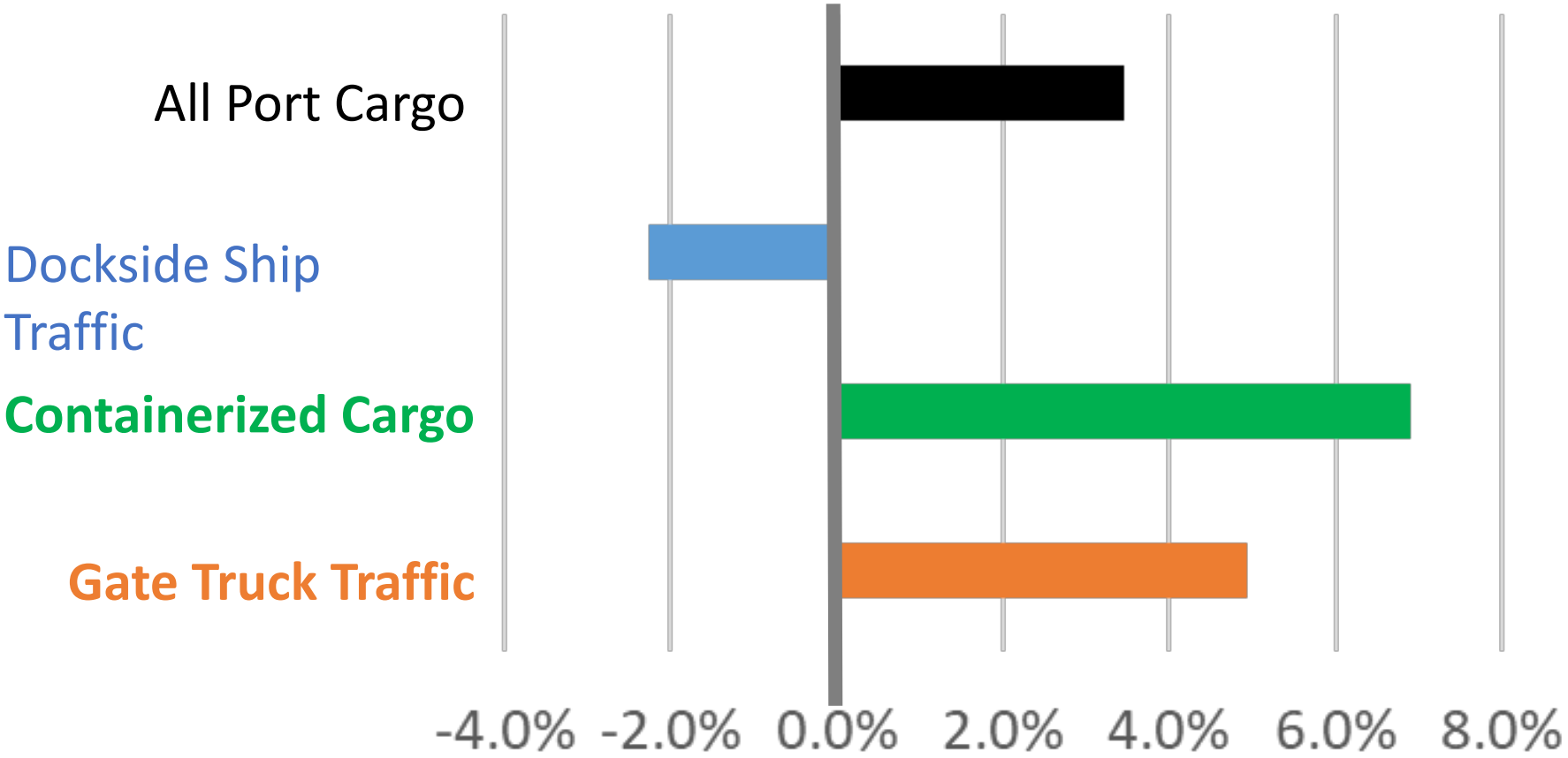
   long-haul goods movements become short-haul and local deliveries

2. Freight trends are not the same as traffic trends (across modes)

3. Big freight patterns emerge in our regional corridors from:
   - Small, enterprising firms taking separate actions, aggregated
   - Large firm(s) making big decisions, maybe game changers
   - Community mobility patterns shifting in or out of sync with road system

Port of Wilmington Freight Change (%/yr)

Data prior to new port management



Logistical Freight Questions

- What is the trend horizon of interest?
- What starting time do we use for the trend?
- Is our business in equilibrium, stable, or predictable now?

What would punctuate change or disturb our business?

Transforming Example: Zero-Carbon Freight

- Decarbonizing freight is a challenge
- Delay in logistics is a resource

- Ship financing takes into account low-carbon performance
- Social cost of carbon ≠ Supply chain cost of carbon

- Recapitalizing the fleet needs some messy experimenting

- The value proposition for goods movement is growing

What is happening to supply chain now?

- **Container shipments have grown by 290% since 2000**
- **Vessel overcapacity, “right-steaming”**
- **Supply chain is more intermodal**
- **Distribution Centers now twice the size from a decade ago**
- **Alternative ports are on the rise**

http://www.capacityllc.com/blog/7-striking-stats-logistics-global-local/

Recall 2009?

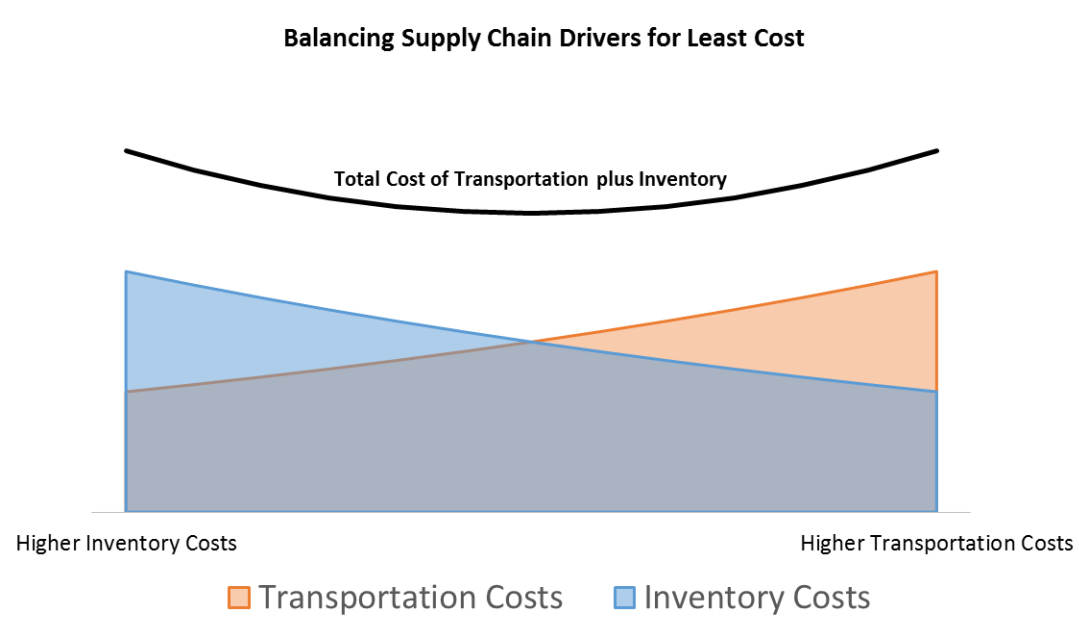
- **Maersk Parent Projects Loss of $1 Billion**
  - JOC NEWSWIRE, *12 November 2009*
  - Danish shipping giant A.P. Moller-Maersk, hit by sharply falling demand and freight rates, lost $706 million in the first nine months of 2009 on a 31.7 percent drop in container shipping revenue and said Thursday it expects to lose $1 billion in the full year.

- **Maersk introduces '*super slow steaming*'**
  - Sustainableshipping.com, *12th November 2009* 11:51 GMT
  - Maersk opts for 'super slow steaming'. A.P. Moller-Maersk has introduced "super slow steaming" in an effort to cut bunker consumption.

Sustainableshipping.com, *27th November 2009 00:13 GMT*

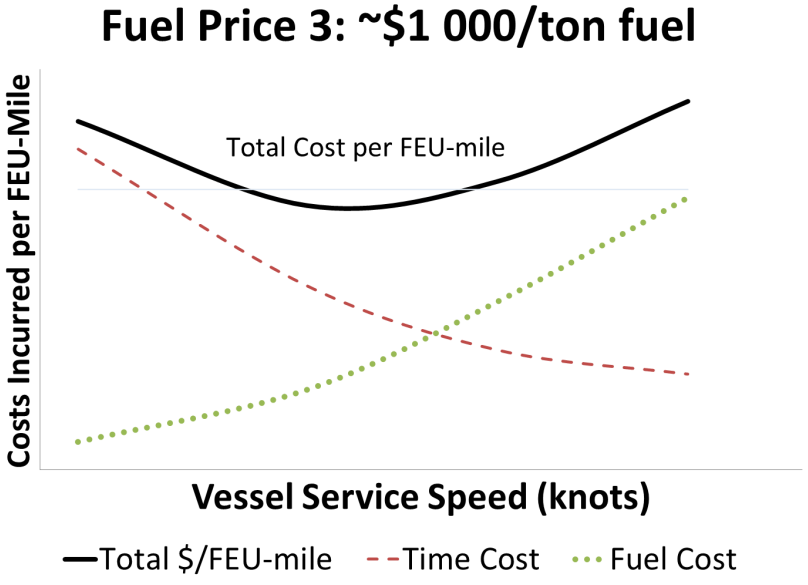
Super slow steaming will cut costs and help the environment

- In order to maintain similar levels of service in terms of frequency ZIM will add a 4,250 TEU vessel to each service. The company added that there will be only minor changes in transit times.
- ***This allowed containerships to sail at half speed, reducing fuel costs and emissions by 10%-30%.***



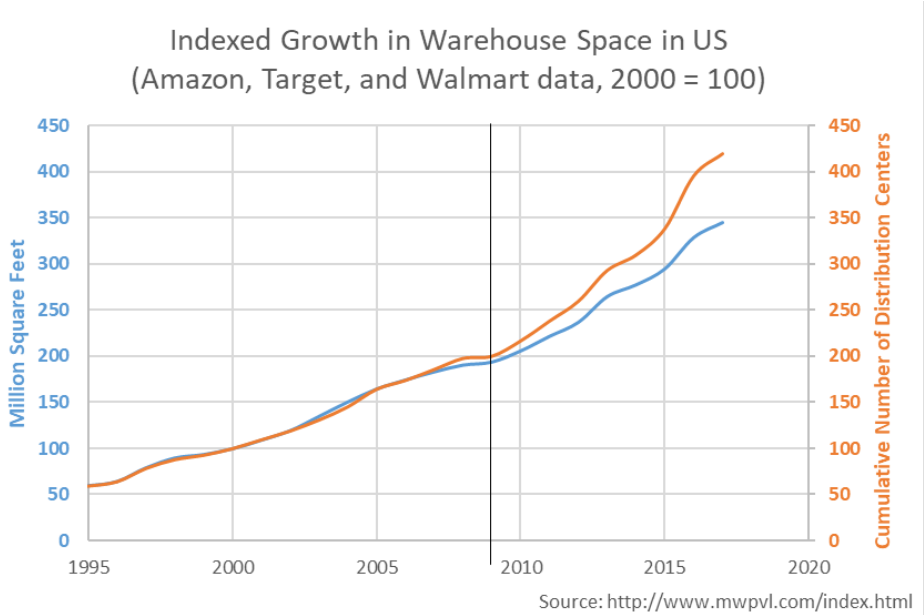
Recognize that the entire supply chain has adjusted to long-run signals by shipping:

1. **Higher energy costs for ocean transport**
2. **Slower speeds to help hold freight rates**
3. **Increased warehousing ("right-shoring")**
4. **Increased value-added handling enroute**



Freight mobility is important and changing

- **Container shipments have grown by 290% since 2000**
- Vessel size/speed, “right-steaming”
- Alternative ports are on the rise
- Supply chain is more intermodal
- **Distribution Centers: larger size and greater number over last decade**



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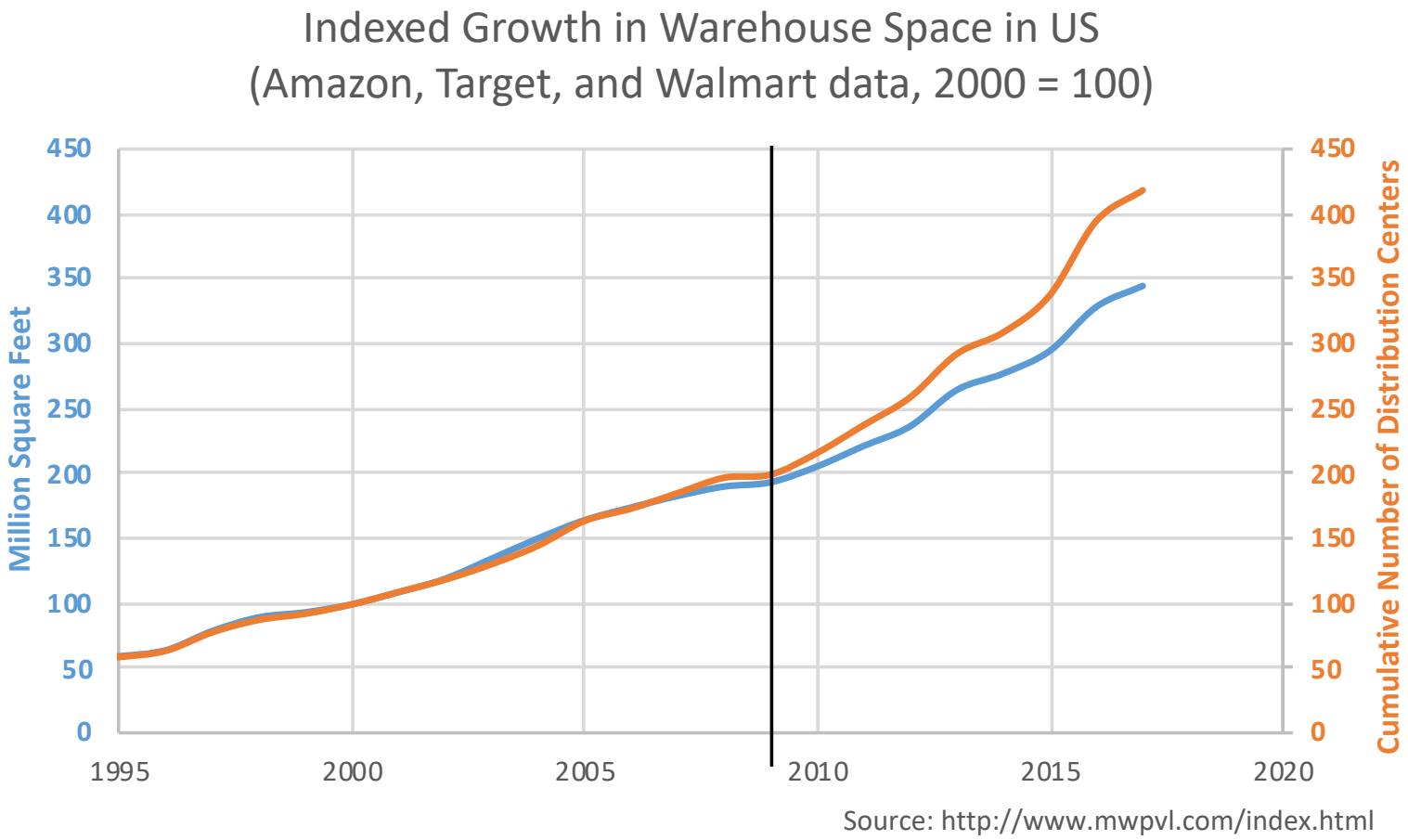
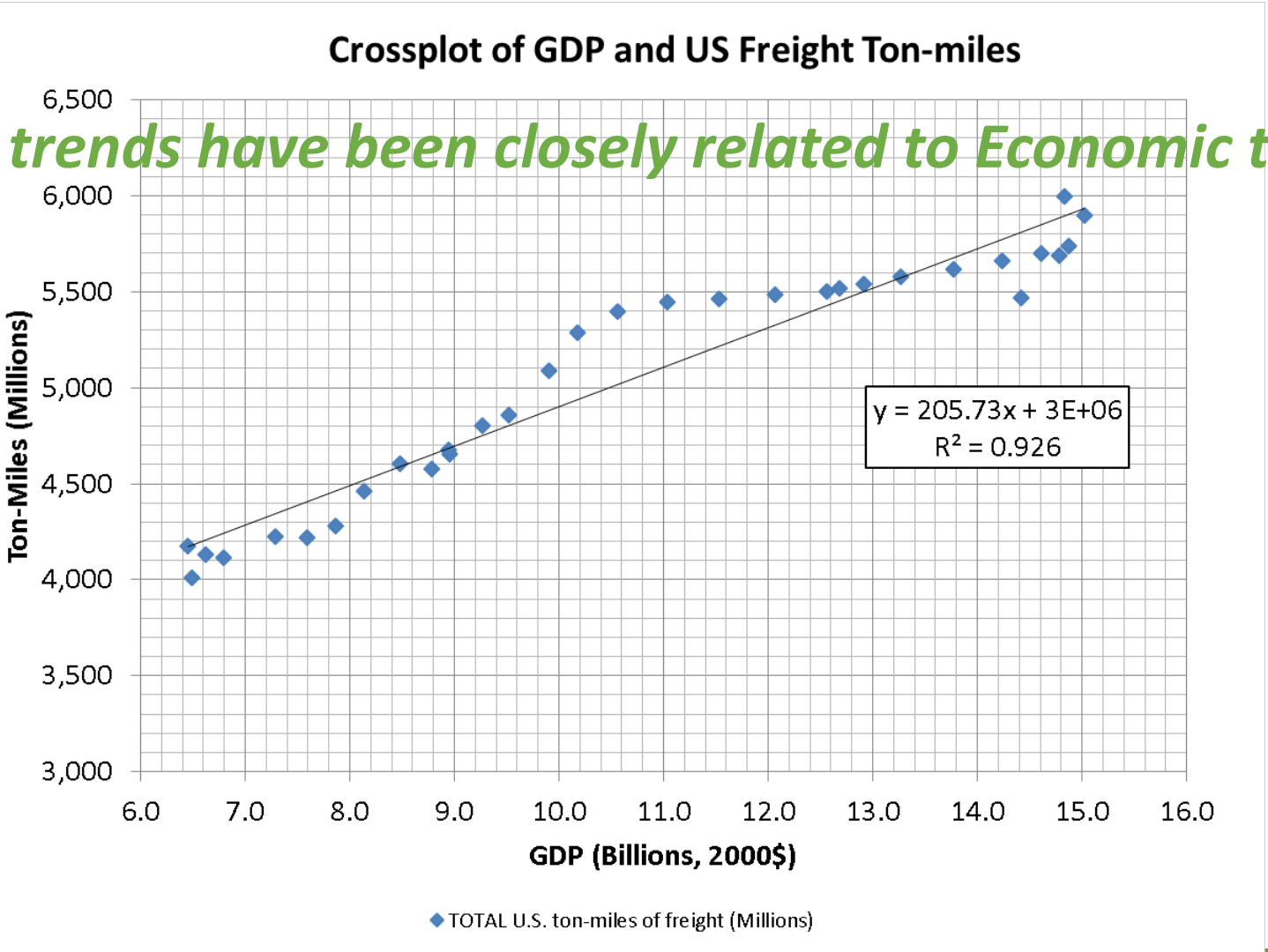
Slower supply chain: value-added (not delay)

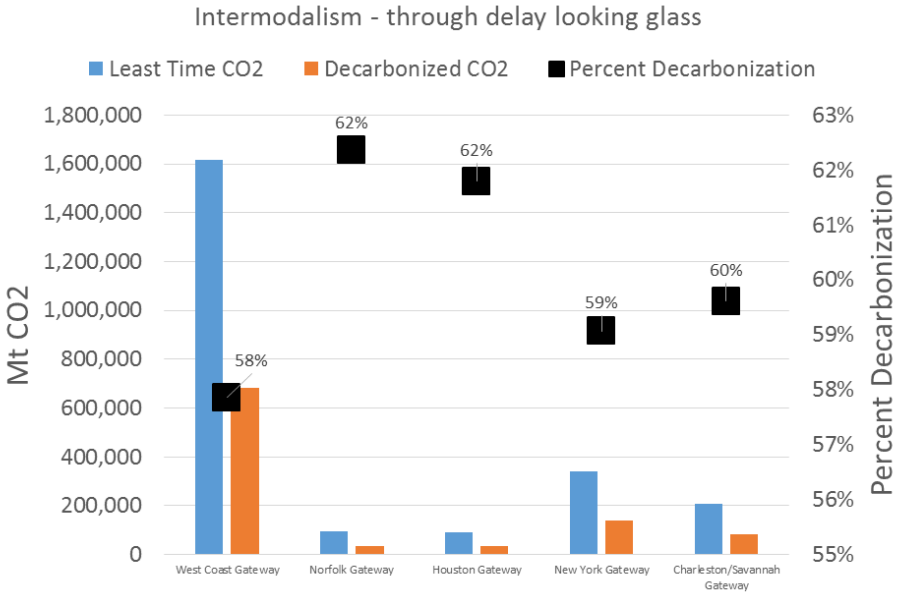


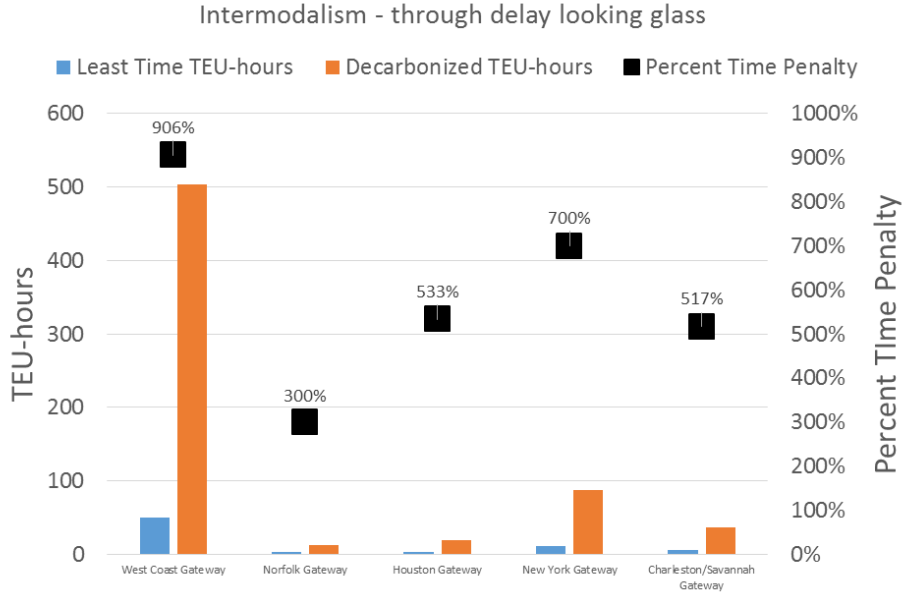
Freight trends have been closely related to Economic trends



The time penalty of intermodal must be offset by value added or very strong CBA benefits

~60% decarbonization => 3 to 9 X more time in motion

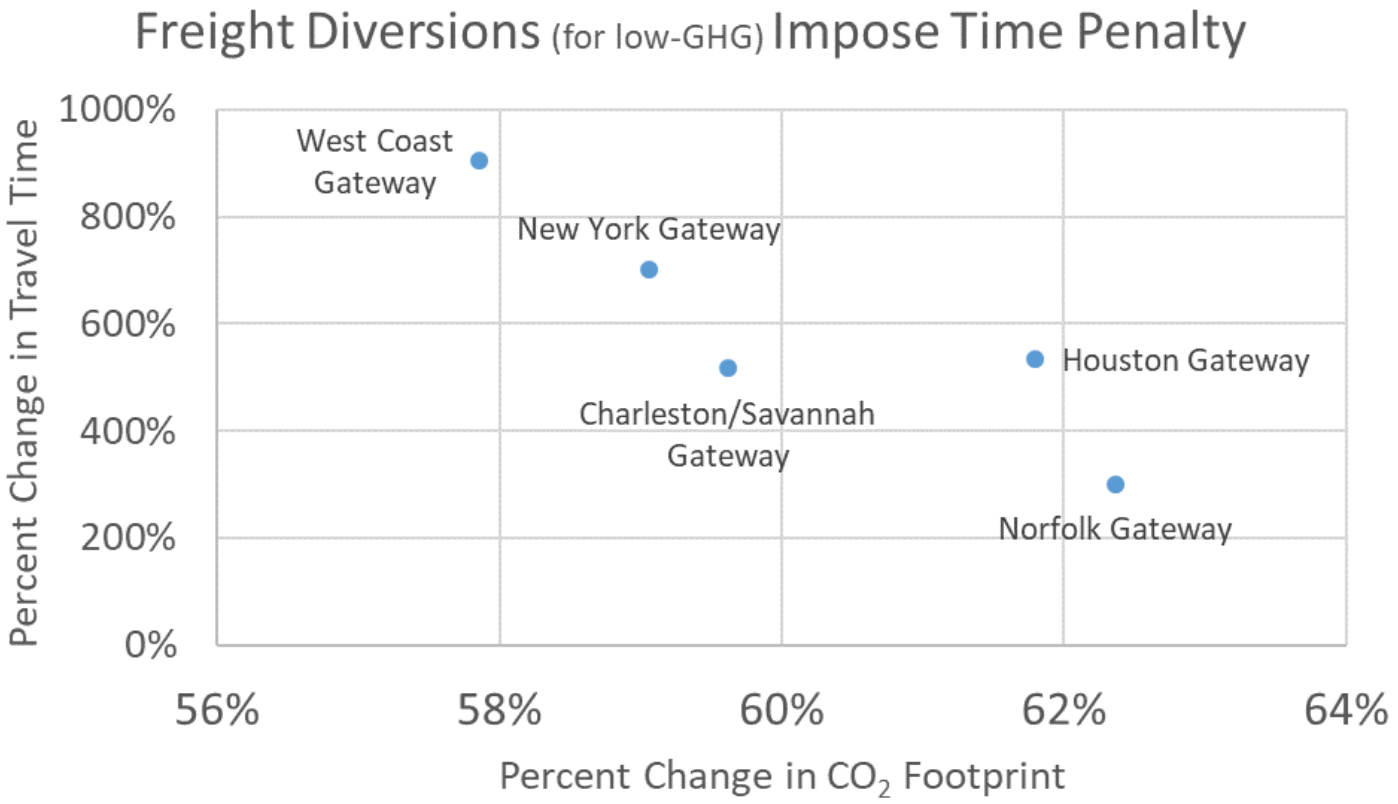


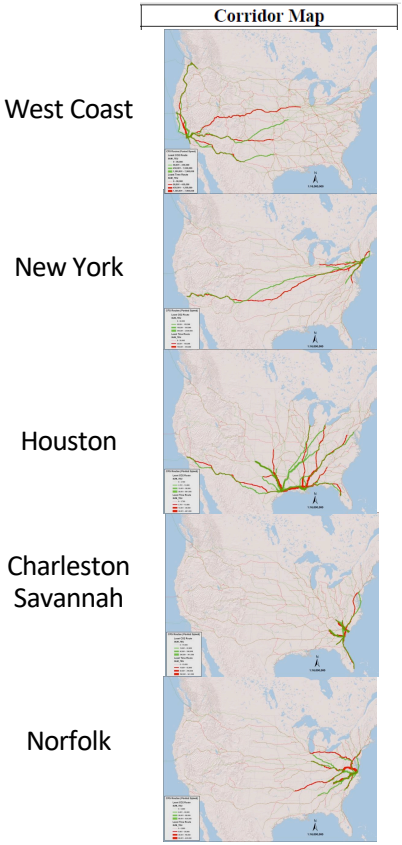


So two elephant-in-room questions: What does a supply chain do with the time available? Can the good tolerate it?

Our National Corridor study ID'd diversion delays

3x to 9x more delay for ~60% GHG reductions





https://ww3.arb.ca.gov/research/apr/past/07-314.pdf
https://www.dropbox.com/s/vvktlrmo0yietu9/Delay%20Final%20Report%2020101102refs.pdf?dl=0

Economic Geography or Dire Straits?

Paths of least resistance and routes of greatest value

Where to Where?

When to When?

- Least Distance – a proxy for time, ignores posted or effective speeds
- Least Time – a function of distances and speeds, plus delays and dwell
- Low Cost – a function of labor, vehicle technology, payload characteristics
- High Value – the relationship between cost and freight rate (profit)

- Dire Straits analogy *… six lanes of traffic; three lanes moving slow*?

- What variables and responses fall under control of a decision actor?
  - Fleet, dispatch, route – trucking company, logistics provider
  - Road infrastructure, transport rules – transportation planning authority, engineer
  - Location, Location, Location – shipper, value-added processor, receiver

Innovative change space
Example: environmental performance

	Reinforce positive trends	Reverse negative trends
Existing efforts	*Complementing* • Do more environmental actions e.g., voluntary reporting	*Restricting* • Do fewer harmful actions e.g., green-ops, discharge controls
New efforts	*Incentivizing* • Considered architectural • Disrupts status quo • New systems emerge, modes adjust e.g., eco-speeds, changing networks	*Transforming* • Disrupts traditional metrics • New dominant designs e.g., EEDI and SEEMP, ECAs

Corbett, J. J. & Winebrake, J. J. Environmental issues in international trade and transportation. in *Handbook of International Trade and Transportation* (eds. Blonigen, B. A. & Wilson, W.) (Edward Elgar Publishing, 2018).

Doing freight right – what is changing?
…new investments, new energy outlook

Key trends changing this decade(s)

- Right-shoring
- Right-steaming
- Right-routing
- Right-timing
- Right-bundling
- Right-mode mixing

Thank you