Supply Chain Disruptions & Inflation

Report to the State of Colorado Task Force on Economic Recovery

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UNIVERSITY OF COLORADO BOULDER

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Our Agenda

1. How did we get here
2. Economic reactions by supply chains & risks as we move forward
3. Ideas for speeding recovery

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Executive Summary

- A confluence of factors have resulted in disruption of supply chain performance:
  - 30+ years into a globalization effort to efficiently link geographic disparate supply chain partners
  - Logistics capacity constraints and imbalances; coming into and exacerbated by Covid
  - Capacity reductions for Covid protocol exacerbated by “The Great Resignation”
  - Unexpected demand surges placed on supply sources that braced for an economic downturn
  - “One-off” headwinds exacerbate logistics imbalances (e.g. Suez Canal, I-70 closure, Dallas Ice Storm)

- Commercial response to imbalances and shortages has been to “pay any price” as their own demand surges (Regional examples: Ball Corp, Danone, Arrow Electronics)
  - Challenges are not only for raw material sourcing but also the infrastructure that makes supply chains move (e.g. containers, pallets)
  - Risk – highest-bidder influence on demand may extend the misery. As companies push harder with one of the few levers they have, the demand signals become less reflective of real demand, exacerbating a “bullwhip” effect. 9–18-month predictions for challenges to clear may extend.
  - Risk – a percentage of the current inflation seen (Consumer/Producer Price Index (CPI/PPI) may be slow to retreat

- Opportunities
  - Invest in partnerships that “shorten” supply chains
  - Invest in infrastructures and technologies that reduce logistics imbalances
  - Support capacity-resourcing for key-producing companies to aid in return to Covid-safe, “full-strength” production
  - Investigate, understand root-cause reasons behind exit from the work-force and complement employer efforts.

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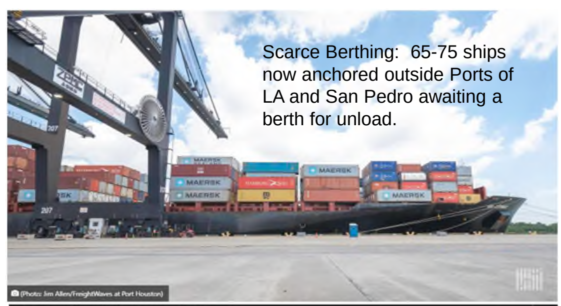
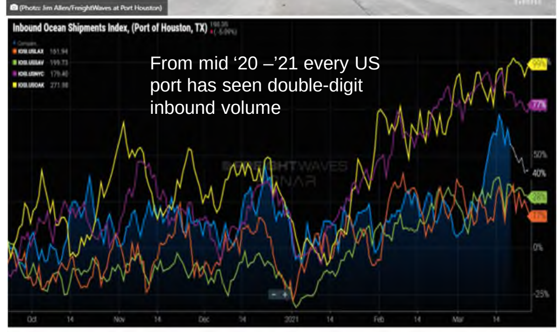
How did we get here

- ’90s global outsourcing resulted in expanded then optimized supply chains nodes/partners located to create economic value
- Pre-Covid e-commerce explosion in demand for last-mile logistics WHILE driver availability diminished. Exacerbated by “everything” to the home. (e.g. Current freight tender rejection rate at 14:1).
- Covid-induced logistics asset contraction in anticipation of economic contraction (“get ahead of Great Recession impact”)
- Covid-induced shifts in consumptive demand forms (e.g. commercial/institution vs home use).
- Unexpected Covid-driven demand for shut-in driven needs (e.g. home goods, recreational, personal items)
- Pre-Covid logistics asset (container) imbalances: West to East dominated flow, Colorado (e.g.) dry van I/B vs O/B imbalances, operations time disparity (8 vs 24-hour operations)
- Covid-induced “safe” production capacity constraints followed by overall reduction in worker availability … “The Great Resignation”
- Complicating events: Suez Canal, et al.





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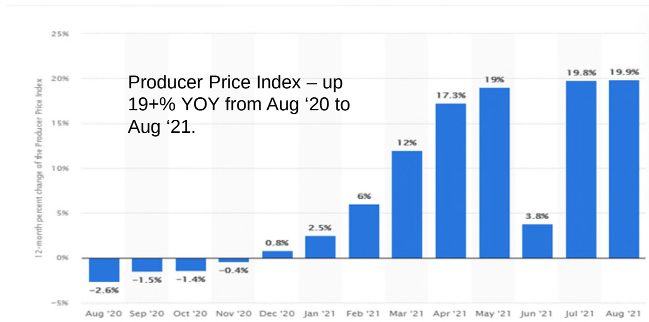
Economic Reaction & Risks

- Burgeoning domestic demand forces producers to scramble for base material and logistics on an already stressed market. Scramble = resources regardless of price.
- Supply chain (move) assets like containers, trailer chassis, pallets, and slip-sheets are mis-positioned with currently poor economics for their re-positioning.
- Risk – Escalating prices for supply distorts the demand signal accuracy between actual and perceived demand likely lengthening the time to unravel the supply chain challenges and logistics channels.
- Risk – myopic or unilateral moves to increase capacity moves the bottleneck, doesn't resolve it. (e.g. make ports run 24/7 without commensurate land-transport and production elements do the same thing.)



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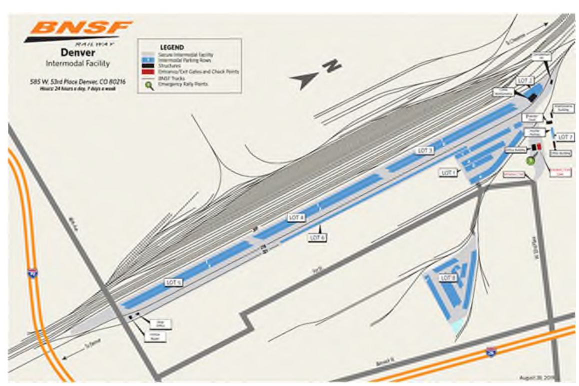
Suggestions, Opportunities

- In economic development efforts, seek inter-state partnerships to create "shorter" supply chains. Think regional collaboration vs global sourcing or siloed (state-only). Shortens logistics and time reducing lumpy signals while diversifying risk across geographic regions.
- Support infrastructure development efforts to expand non-truck-based logistics capacity providing better scale, while relieving pressure to buy assets into an inflationary market. Judicious investigation & investment into PSR Intermodal in/out of Denver represents one alternative.
- Support DOT, CDOT, & Commercial efforts to improve use of technology to improve supply chain transparency and visibility (where's my stuff?).
- Investigate root causes for staff attrition/resignation in supply chain roles (planning, procurement, production, logistics, return/reverse). Support employer efforts.

Consider support for Precision Scheduled Railroading (PSR).
Denver BNSF Intermodal (Denver & Titan Rd. (Heavy Lift))



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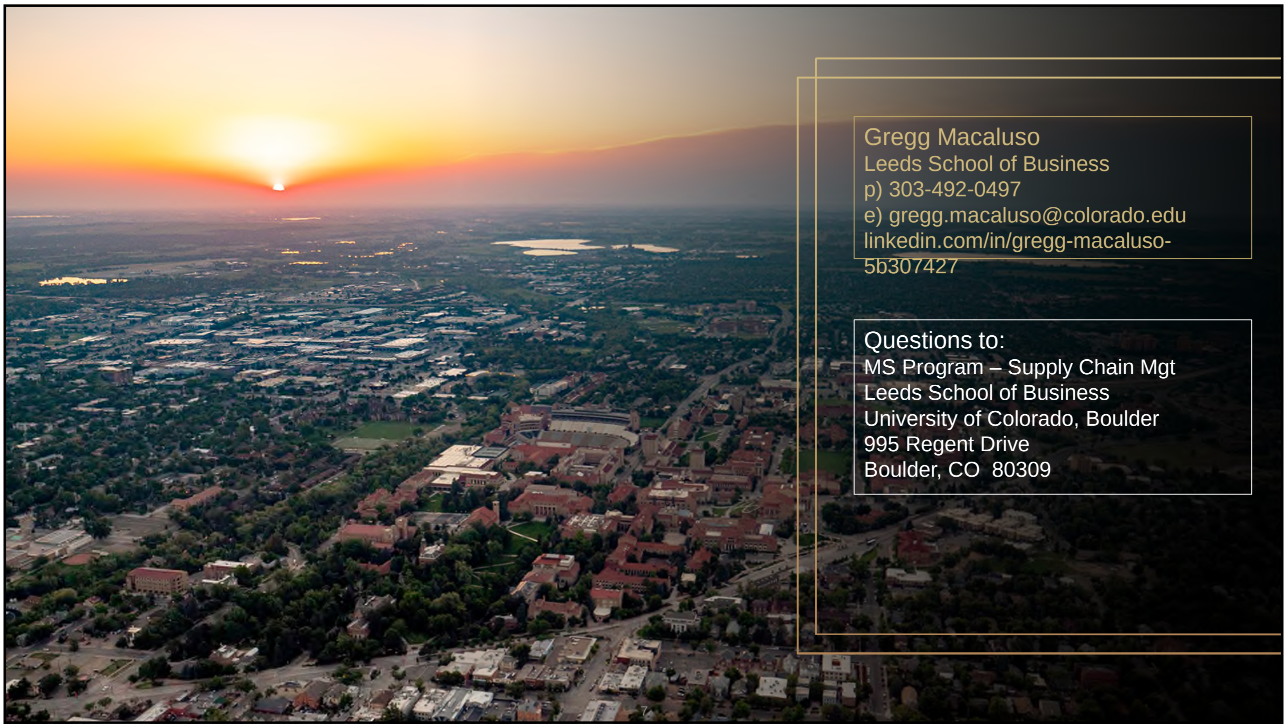
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