



Emergent Issues related to Freight Systems Impacted by the COVID-19 Pandemic

As of 0800 Hours (Eastern) on Saturday, April 4, 2020

This document assesses the national freight system that connects demand and supply networks for many critical commodities in order to understand strategic risk and, potentially, offer recommendations.

Consensus Assessment: Based on available data and consultations with industry leaders, the national freight system has to date **effectively adapted to significant changes in demand for several sectors**. Last week, we reported that the surge in grocery demand in early March more than offset declines in demand from businesses classified as non-essential. While current volumes are still higher than they were at this time last year, half of the 20% gain realized by mid-March has already been lost. **Reefer volumes also declined, particularly in the spot market, indicating that the grocery demand is also cooling off**. A sharp and sustained drop in volumes, coupled with the looming economic recession, could have significant effects on an already volatile trucking industry. Once capacity is lost, it may not be recovered quickly. For the moment, freight flows have been maintained despite increased complexity from Non-Pharmaceutical Interventions restricting business operations that vary by jurisdiction. **Safety remains a high concern among the supply chain workers who are the backbone of the nation's food system; their proper protection remain paramount as the nation addresses this health crisis.**

Force on Target: Pandemic disease challenges traditional emergency management and business continuity plans. Despite the lack of infrastructure damage common to such planning, the entire population has become a target of concern. Prevalence of COVID-19 does vary in the U.S. ([e.g., the New York City Metro Area makes up 43% of all U.S. cases](#)) but cases continue to rise rapidly across the continental U.S. (CONUS). As a result, the public sector broadly imposes mandatory measures restricting travel and commercial operations. While transmission of COVID-19 poses a risk to the essential supply chain workforce, there are other forces at play that increase the threat to freight movement. To date, the forces affecting transportation have been volatile freight demand, based on dramatic consumer behavior, and broad government measures, which have made the operating context more uncertain through escalation in official measures to control virus transmission.

Geography Targeted: Complementary ecosystem assessments focused on grocery supply chains in Seattle and New York. This assessment focuses on freight flows for the CONUS. The broad geography makes it difficult to assess risks spanning numerous and varied companies and facilities for a sector-wide supply chain. However, it will identify national-level risks for the freight system that connects the network nodes of numerous sectors. Just as the bloodstream carries vital nutrients throughout the body, the freight system carries essential commodities throughout the nation's communities.

Population Targeted: The entire CONUS population of over 300 million is a potential host for COVID-19.

The assessment begins with a synthesis of "sentinel indicators" regarding freight movement. Sentinels are individuals with experience and insight regarding flow, operating context, and system performance.

Demand and Supply Networks: COVID-19 has shifted consumer patterns due to anxiety-induced demand in some sectors and business closure in other sectors. Freight broker reports and data indicate that the net result was higher overall freight demand in March with signs of decline recently. There is less agreement about the trend going forward. **Some anticipate a "freight cliff" as grocery demand levels off or decline and portions of the economy are shuttered; others see a more gradual decline in freight volume.** General supply and demand signals are mixed. [China's manufacturing, after falling sharply in February, bounced back in March](#). After half of container ship sailings to China were cut last month, this could signal a return of inbound freight to West Coast ports. A surge of ocean containers

could back up ports and movements from terminals to DCs. **Containers delivered to facilities not currently operating may sit, which ties up not only the container but also the chassis.** However, demand for this production surge may not materialize, given that the [Federal Reserve's Weekly Economic Index has dropped this past week to levels not seen since the 2008 recession](#). While GDP, which is influenced by the service sector, is not directly correlated to freight volume, the drop may signal lower consumer spending. Novel market conditions have upset traditional network movements and carriers are scrambling to find loads on lanes where non-essential consumer goods have dried up.

Operating Environment: Non-Pharmaceutical Interventions such as shelter-in-place orders have dramatically reduced competition on the roads and increased speeds. Anecdotal reports of delays to load/unload at facilities persist but are difficult to quantify. Delays have been attributed directly and indirectly to virus control measures as [conditions vary state-by-state](#). Carriers continue to seek clarity on “safe passage” guidelines to ensure movement across governmental jurisdictions at a time of proliferating restrictions. For instance, 17 states did not include CISA’s essential worker list along with their business closures. **New concerns have arisen regarding employee retention as the CARES Act went into effect on April 1**, which offers an additional \$600 per week in unemployment insurance. Some companies have created premium pay incentives in response. [The CARES Act also aids employers through tax breaks, loans, and payroll assistance](#). Finally, shippers and carriers continue to struggle in defining safety practices for social distancing and material handling applicable to their context, as well as procure the necessary PPE and cleaning supplies. This not only puts the workforce at risk, but could hamper flows as [more](#) and [more](#) employees stage walkouts. **Standardized and specific health guidance for practical implementation in the supply chain workplace would enable efficient, safe operations along with a personal sense of security for this essential workforce.**

Freight Systems: Despite dramatic market shifts, carriers are adapting to meet demand. Continual adaptation may be required, as indicated by movements in the spot market (see data below). Fleet capacity and driver availability are areas of concern. Waivers relaxing hours of service regulations opened up additional capacity. However, carriers with fleets of less than 100 trucks, which represent [28% of the market capacity](#), are more vulnerable to cash flow issues as the economy slows. **The trucking industry may need priority access to liquidity in order to keep trucks on the road.** Regarding drivers, large carriers are reporting full training classes as independent drivers look to join established carriers. [FMCSA issued a three-month waiver that will issue licenses to commercial learner’s permit holders](#), but the process to add new drivers remains unclear as some states have closed their state driver licensing agencies. In addition to direct illness risk for the driver population, indirect impact on their availability may arise as they experience loss across their own families and close associates. It has become clear across the nation through [recent projections](#) that the response to this pandemic will be a marathon and not a sprint.

Assessment continues with “data indicators” regarding freight movement based on indices that draw on an array of data feeds and aggregate data provided by individual companies.

The Tender Volume Index (TVI) was established on March 1, 2018, at a national level of 10,000. The national index reflects overall tender growth (e.g. 12,000 would indicate 20% growth) and sub-indices reflect relative changes in segments. Tender volumes indicate where demand for trucks is increasing or decreasing and are tracked by inbound and outbound movements for each freight market. Figure 1 on the next page shows U.S. tender volumes for all equipment types for the most recent 12 months (black line). Dry van (purple) and temperature-controlled (orange) volume sub-indices are also shown. Temperature-controlled (aka reefer), representing ~20% of total freight, and dry van volumes have started to decline. Note that the overall market also includes flatbed and specialized segments, which are smaller.

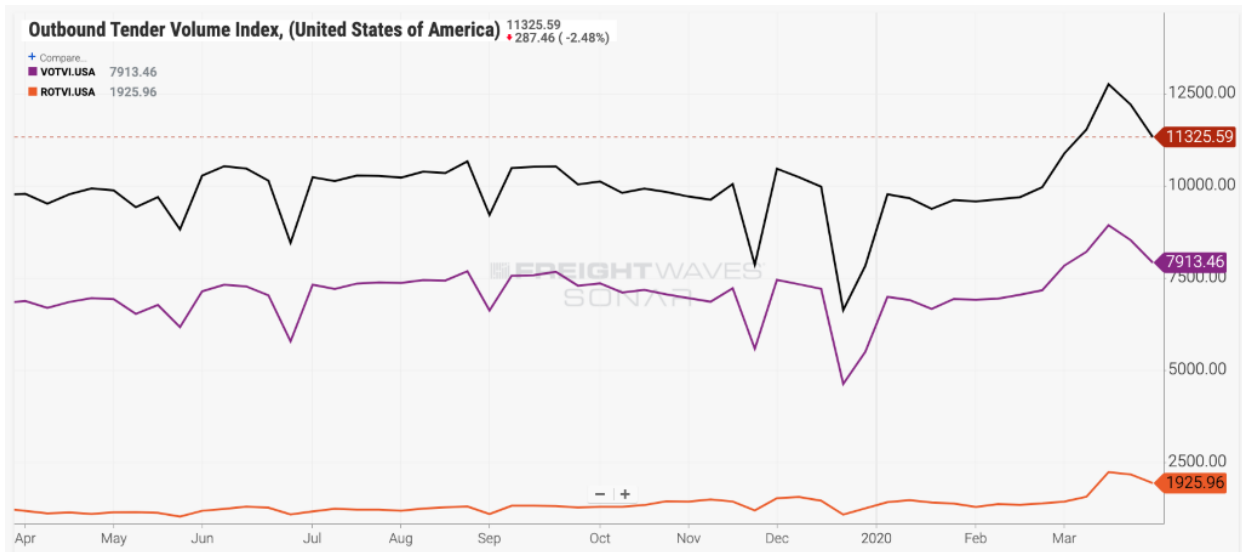


Figure 1: Outbound Tender Volume Index (Freight Waves SONAR)

At the recent peak, when COVID-related panic buying ensued, U.S. tender volumes were the highest in three years, marking 20% growth since the TVI inception in 2018. In the past two weeks, the TVI has already decreased by 10%. Industry experts and economists disagree regarding the bottom of this index, with many projecting volumes drops similar or worse than holiday dips over the past year.

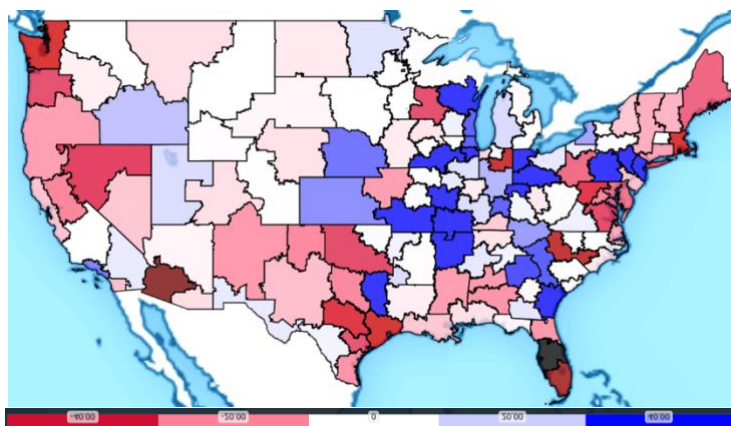


Figure 2: Headhaul Index (Freight Waves SONAR)

The Headhaul Index compares outbound and inbound tender volumes. Figure 2 maps this gap for the past day. Blue areas have more tenders for outbound than inbound. This indicates “tight” capacity, which means that trucks are in short supply. Inbound shipments into tight markets are less expensive since there is likely a return load for the driver (aka “backhaul”). Conversely, dark red areas have more inbound tenders than outbound, indicating a “loose” market. Thus, it would be more expensive for inbound shipments to these markets

since drivers are less likely to find a backhaul. Combined, these colors indicate the predominant sources and destinations for freight flows. For example, markets in eastern Pennsylvania with large distributors have been very tight as peak volumes are moving into large eastern cities like New York and Philadelphia, which are colored red. Looking at the Headhaul trends over the past three months indicate that the majority of markets maintain a consistent “status” as a tight or loose market. What is notable, is that the polarity (e.g., darker reds and darker blues) in the last month across markets increased and markets that were once balanced have become less so. The largest fluctuations have been incurred in tight markets, such as Harrisburg, Pennsylvania, and in backhaul deserts like Lakeland, FL.

While Figure 2 shows daily market conditions, it reflects aspects of the overall market structure for freight movement. One notable exception is that the West Coast, which would normally have attractive backhaul opportunities with large volumes from post Chinese New Year imports, remain relatively loose.

One consistent market status worth noting is the eastern Pennsylvania corridor as tight, indicating its essential role as a distribution hub for the Northeast.

The data above mostly represent contracted fleets. With recent shipper departure from contract plans, we also consider changes in the spot market. They reflect unanticipated changes in demand as shippers seek last minute capacity. Volume and rate information for the spot market provided by DAT aligns with the volume decreases for contract carriers shown above. Load volume for [dry van decreased by ~10% over the past week](#), bringing it back to volume levels from two weeks' prior. At the same time, reefer volume, as seen in Figure 3, grew by 40% last week but dropped by 25% this week, indicating flow dynamics for grocery.

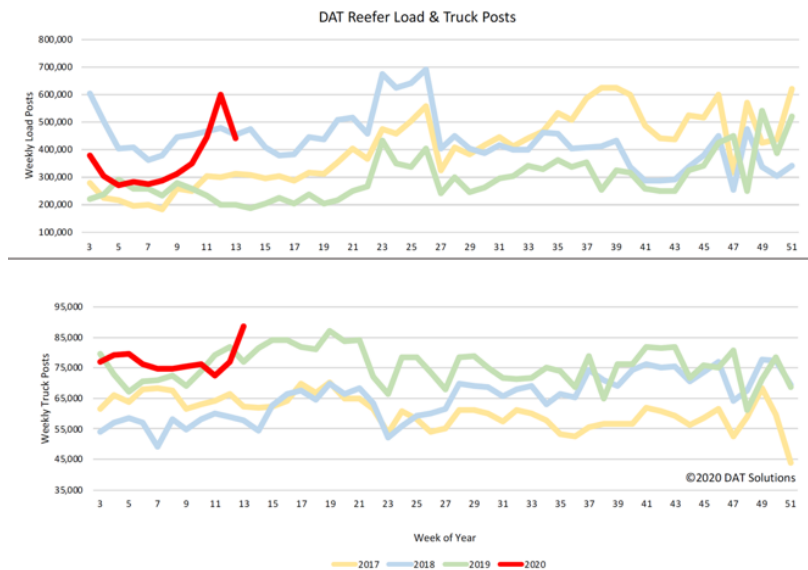


Figure 3: DAT Reefer Load & Truck Posts

While forecasting the economy is difficult, freight volume seems to be declining fast following a surge but still typical for this time of year. If downward trends continue, future lows may be akin to those seen during holidays when freight normally slows down (i.e. 2019 Labor Day and Christmas in Figure 1). **This may put carriers with weak balance sheets at risk, especially carriers not hauling CPGs, grocery, or health sector freight throughout this period of social distancing.**

SCAN is intended to answer two questions:

1. Are key demand and supply networks failing?
2. If so, when, where, why, and with whom can FEMA engage to be most effective in reversing failure?

In the current judgment of the Ecosystem Assessment team, **demand and supply networks that span the nation are not failing, but they are forcing the freight system to adapt.** Novel demand and supply conditions are testing the limits of the freight system's adaptability, though it has remained resilient. Still, the risk of friction, fragmentation, and fear persists. Regulatory transportation impediments and essential workers' health should still be mitigated by thoughtful disease interventions and workplace safety guidance. In addition to safety concerns, workforce uncertainty across the supply chain has an additional economic dimension with implementation of the CARES Act. A potential "freight cliff" could eliminate carriers that struggle with liquidity and government financial support should consider the economic strain for essential businesses like freight transportation. **FEMA should promote targeted support for essential workers and business entities to maintain capacity for freight systems that have thus far adapted to supply chain uncertainty.**

[The Supply Chain Analysis Network (SCAN) is intended to provide two evidence-based products to FEMA. Within the first twenty-four hours – and thereafter as needed – an "ecosystem assessment" is developed focusing on inbound and outbound flow, principal nodes, links and/or channels, critical dependencies, and a strategic assessment. This is complemented by a regularly updated "lifelines assessment" that provides more detail on individual flows, network behavior, and observed changes. The information above is intended as an ecosystem assessment. The ecosystem assessment attempts to synthesize a strategic view. The lifelines assessment attempts to analyze operational progress. These products are intended to depend on open sources.]