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

As of 1800 Hours (Eastern) on Friday, April 17, 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. The Supply Chain Analysis Network (SCAN) supports the FEMA Logistics Management Directorate with analysis and subject matter expertise. The background, points-of-view, and opinions expressed by SCAN do not necessarily represent the positions or policies of the Department of Homeland Security or the Federal Emergency Management Agency.

Consensus Assessment: National freight volumes continue to trend downward. No one knows where the "bottom" will be, or how quickly we will find it, but additional volume drops are anticipated while businesses remain shuttered and import volumes remain low. Even if the "bottom" is upon us, some carriers are struggling with cash flow to cover their costs and have not had ready access to federal aid. **Intermodal rates have declined as cancelled sailings have proliferated, creating an increasingly imbalanced freight system, with equipment in the wrong places**. PPE procurement and maintaining clean facilities are becoming increasingly challenging and costly, and absenteeism numbers – virus and fear related – are going up. **Prolonged strain will continue to erode the efficient transportation capacity that shippers have come to rely upon**.

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 is a target of concern. The public sector has imposed varying degrees of measures restricting travel and commercial operations in most jurisdictions. Transmission of COVID-19 poses a direct risk to all, including essential supply chain workers. Unprecedented shifts in shipper demand among essential and non-essential businesses have challenged the freight system's agility. And carriers must adapt in the midst of a novel operating environment due to public and private efforts to control virus transmission.

Geography Targeted: This document builds on previous assessments of freight movement for the CONUS (Contiguous United States) and focused assessments of grocery supply chains for metropolitan or regional markets. The national scope makes it difficult to assess risks for supply chains in specific sectors of the economy that are now essential. However, it assesses national-level risks for an essential service sector that connects the network nodes for all supply chains.

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 impacted the global economy due to a combination of public health constraints and anxiety-induced behaviors for businesses and consumers. Market indicators continue to trend down. **Total contract tender volume decreased a further 12% since last week and 15% since this time last year**. Specifically, contract reefer and dry van tender volume are down 44% and 33% respectively since the mid-March peak. As spot market volume has fallen more than 30% in the past week across most regions, spot rates continue to drop as well. Refrigerated spot market rates have fallen below 2017 levels. Available truck posts now exceed the number of loads available for dry van, and reefer closely follows with almost a 1:1 ratio for load-to-truck posts (see data below). Increasing truck posts in the spot market (10-30% of the overall freight market) are an indicator that **contract volume is drying up**. Imports from China to the West Coast (and overall) may be up from last week, but container lines are still at risk of losing $23 billion due to shippers cutting orders. Intermodal rail volumes plunged to near decade lows, as import volumes are lower than they have been in seven years. Produce season, and typically the home-improvement season, kick-in during this time of year, but disruptions to the upstream supply chain and economy in general may impact both the supply and demand side for these sectors. Overall, as volumes have pulled back, available freight is becoming more concentrated in

supply markets in the country. Such imbalance in the freight market reflects continued destabilization of demand and supply networks among essential and non-essential businesses.

Operating Environment: News reports of essential worker illness continue to heighten anxiety and absenteeism. Higher absences are being reported among warehouse workers, with only a slight increase in driver absences. Some companies are providing hazard pay to incentivize employees. Worker shortages create bottlenecks at warehouses and increase unload/load times and create the need to reschedule outbound shipments altogether in some cases. Essential supply chain companies still face challenges in obtaining PPE for their workforce, including masks and hand sanitizer, despite sourcing from creative channels like distilleries and breweries. Companies are increasing screening and cleaning protocols in order to protect employees and reduce anxiety. Jurisdictional differences persist, leading to reports of confusion about PPE requirements for drivers (e.g. NJ, Laredo, TX) and added complexity to existing operations. Some states note that truck drivers are exempt from certain travel restrictions, while others are providing free lunches. Unexpected worker absences, facility shutdowns for cleaning, and ever-changing environments for truck drivers constrain flows and perpetuate fear among the workforce. The need for collective guidance and standards at the national level is stronger than ever in order to maintain safe and efficient supply chain operations.

Freight Systems: As the freight market is forced to adapt to unprecedented volatility, constrained operating conditions, and precipitous drops in volume, carriers are taking loads where they can even if not profitable. **Major ocean carriers continue to cancel sailings, with 212 of the 384 pandemic cancellations coming in the last week alone**. The estimated 6.4 million TEU capacity loss is causing disruptions for domestic carriers and exporters, which directly impacts flows to places like Hawaii, CNMI, and Guam. There are growing concerns related to equipment shortages at coastal and inland terminals as trucking companies report an increase in the number of containers piling up at their locations in part due to imports lagging backhaul movements. Continued low spot market volumes and rates will accelerate the exit of trucking capacity from freight markets. **There are concerns that the highly fragmented lower end of the trucking industry, consisting of small carriers with six or fewer trucks, will be ineffectively served by federal economic relief measures**. The trucking industry is **diversified**, and as a result, more **resilient** thanks to these smaller carriers. Potential support from federal aid that was allocated for small businesses that are eligible has been depleted. Some estimate that it may take three to four months for the dust to settle before the industry is able to see who is left standing.

*The assessment continues with **"data indicators"** regarding freight movement based on indices that draw on an array of industry data feeds and aggregate data provided by individual companies.*

Figure 1: Outbound Tender Volume Index; Source: Freight Waves SONAR)

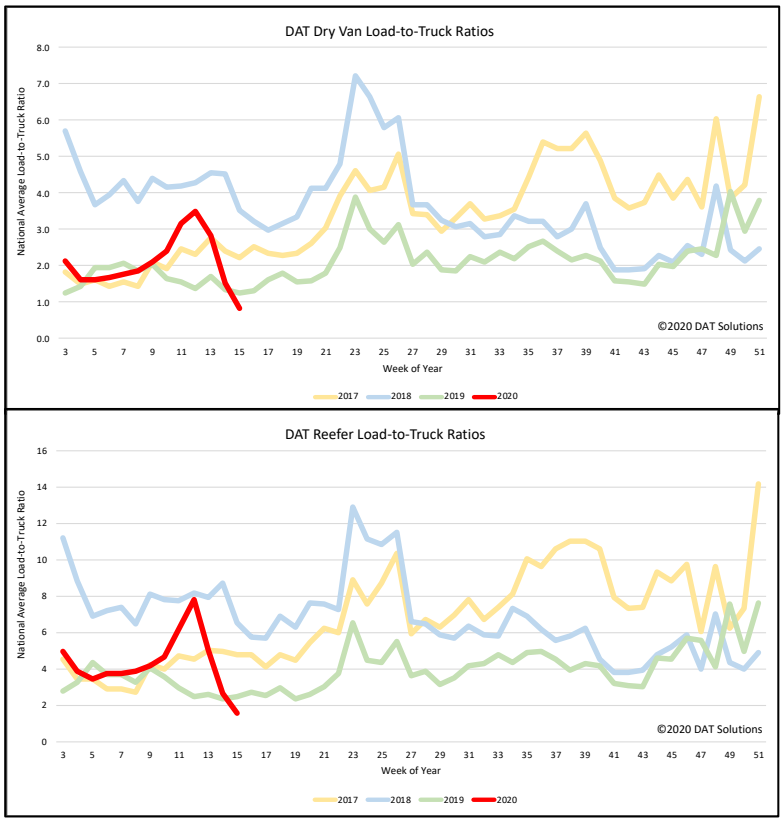

Figure 2: DAT Dry Van & Reefer Load-To-Truck Ratio; Source: DAT

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). Tender volumes indicate shipper needs and are tracked by inbound and outbound movements for each freight market. Figure 1 shows U.S. tender volumes for the most recent 12 months (black line), and last year's tender volumes (green line). At its peak in March, with COVID-related panic buying,

U.S. tender volumes had surged 20% from mid-February and were the highest in three years. **In the past three weeks, the TVI has since lost all recent gains and more as it slid 12% south of 2019 levels, in line with 2018 Labor Day TVI.** While recent declines may appear to be stalling, industry experts and economists disagree regarding the "bottom", but projections are not showing an upward inflection in the near future.

The TVI data above mostly represents contracted fleets. As contracted volume diminishes and carriers seek work elsewhere, we also consider changes in the spot market. Figure 2 shows the DAT load-to-truck ratio (load posts/truck posts), which provides an indication for how tight (or loose) the market is, decreased by 35-40% for dry van and reefer, just slightly less of a decline than last week. **This ratio continues to fall below last year's load-to-truck ratio and signals a bleak outlook for carriers in the upcoming quarter and potentially beyond.**

Figure 3 below from FTR/Truckstop.com, reflects the changes in the 7-Day Average Destination Rates for Dry Van (left) and Refrigerated (right) Trailers ending on April 14, 2020. Most states have experienced a decline in rates between 10-30+ % as trucking capacity begins to flood the market. As the economics play out, and rates continue to fall, carriers will be faced with operating losses.

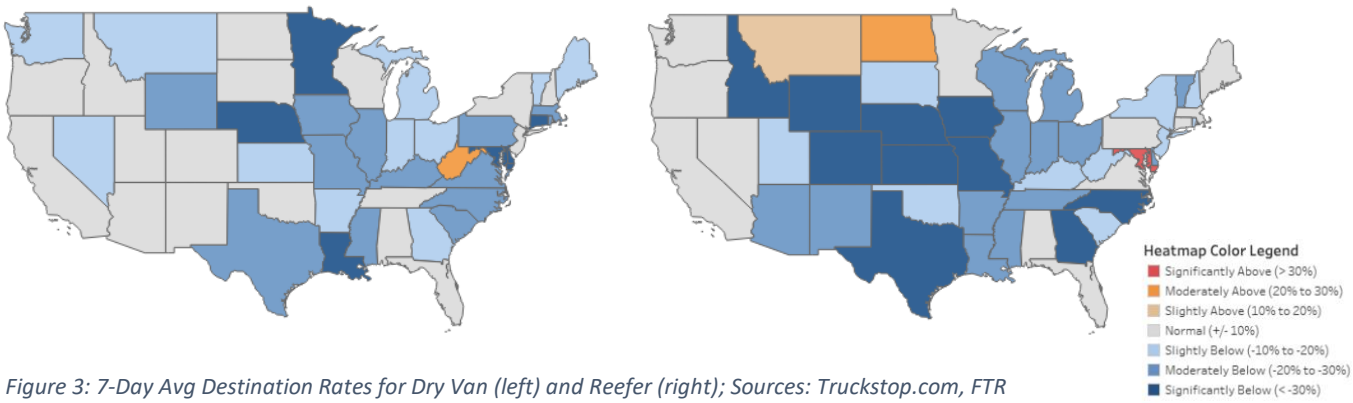

Figure 3: 7-Day Avg Destination Rates for Dry Van (left) and Reefer (right); Sources: Truckstop.com, FTR

We turn to the Cass Freight Index to orient the current state of the freight market to previous economic crises. The Cass indices provide a wide lens for what's happening in the overall freight market as well as the general economy. As the nation's largest payer of freight bills, Cass manages $28 billion annually in freight spend, enabling Cass to compile meaningful data that serves as an indicator of transportation industry trends. Cass indices are primarily volume driven indices that have a baseline of January 1990 and years of reference data. With increased shipments/expenditures come increased freight movements, and generally more trucking activity and revenue flow. Cass has been a solid indicator of the transportation industry highs and lows. In Figure 4 below, the Cass Index (Shipments) has fallen by ~16% since the end of 2019, whereas the end of 2008 to the beginning of 2009 saw a 30% drop. Experts and economists look back at the 2008 Financial Crisis, which took ~2+ years to overcome, to estimate post-COVID-19 freight market recovery.

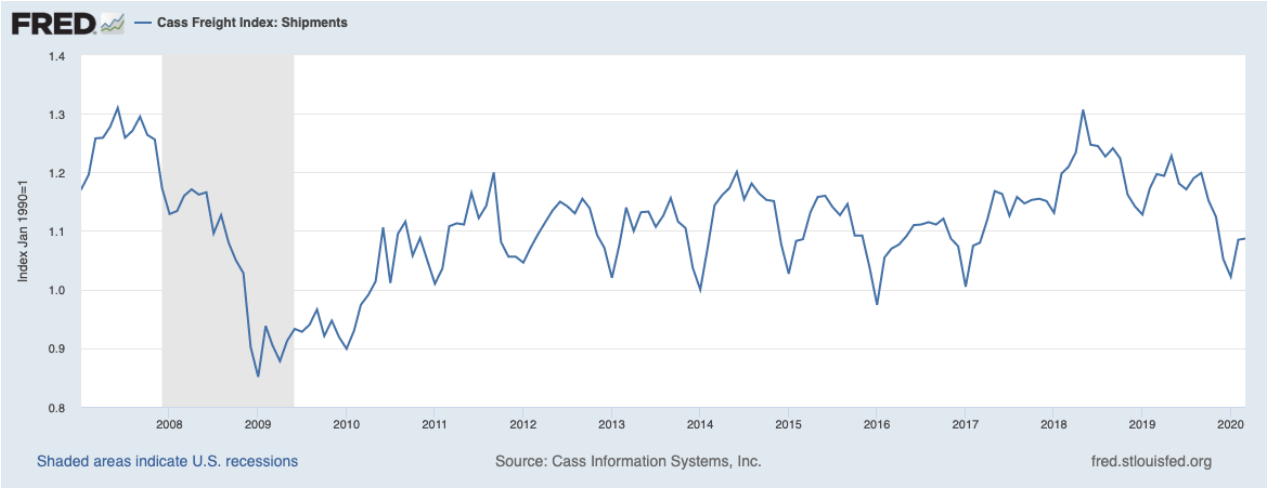

Figure 4: Cass Freight Index: Shipments; Source: Federal Reserve Bank of St. Louis

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?

As in previous freight assessments, industry input and data indicate that even though national **demand and supply networks are not failing despite recent shocks, the backbone that supports this system is beginning to feel the weight of economic impacts.** The question is no longer, "will a freight cliff occur", but rather "how steep will it be"? The continued drop in volume and sinking spot market rates increase financial stress on carriers. **Loss of smaller carriers reduces diversity, agility, adaptability, and overall resilience of the freight system.** As general economic conditions will likely remain volatile while we await a COVID-19 vaccine, a less adaptable freight system may constrain flows and slow eventual recovery. Worker absenteeism is increasing for essential businesses, as they work hard to maintain a safe working environment and provide financial incentives for workers. As the full impact on the freight market remains to be seen, recovery timelines become harder to predict, but there is growing consensus that it will not be quick. **The freight system may require economic support to efficiently serve demand and supply networks rather than encumber economic recovery**.