Emergent Issues related to Demand and Supply Networks Potentially Impacted by the COVID-19 Pandemic

As of 0530 (Eastern) on Wednesday, March 18, 2020

This is the second Ecosystem Assessment developed for what is now designated as covid-19. On January 28, our initial assessment warned, "If the novel coronavirus becomes epidemic in the United States and *if mortality and morbidity rates for this virus continue to be modest*, then **the principal risk to demand and supply networks is likely to be unsustainable surges in demand** reflecting consumer uncertainty regarding the resilience or integrity of local supply chains." This began to unfold over the last two weeks.

In very recent days another significant risk to supply chain effectiveness has emerged. **Decreased workforce participation** – especially in the food processing, distribution and transportation sectors – is beginning to be reported. Where there are school closures, parents are now choosing between childcare and work. In some jurisdictions, shelter-in-place policies have discouraged and complicated commuting. Fear of contagion is a factor. For example, the average age of US truck drivers is fifty-five. When infected, those over age sixty are at greater risk of serious complications. Older truck drivers, in particular, are concerned about making deliveries to places known (or suspected) to have community transmissions. Illness will become a factor in workforce capacity.

State and local jurisdictions are responding to the pandemic with **significant variance in policies and procedures**. Especially for large regional or national supply chain owners and operators, these variations are disrupting flows and basic operations. Local variance in hours-of-service, weight restrictions, delivery curfews, health-checks, cleaning protocols, availability of Interstate rest areas, (in a few cases) perimeter controls, and many more such measures large and small reduce supply chain velocity and effectiveness.

Most state and local governments are attempting to preserve flows of groceries, medical goods, pharmaceuticals, and fuels. Priorities – and procedures for facilitating the priorities -- differ widely across jurisdictions. These variances are having incremental effects that **fragment demand and supply networks**. The recent and still escalating demand surge reflects public perceptions of official actions (or sometimes inaction) perhaps as much as core concerns for the pandemic. Sources of supply have increased production. In some product categories throughput has now claimed all available capacity. Distribution and delivery flows have, so far, been able to effectively adapt to many new constraints.

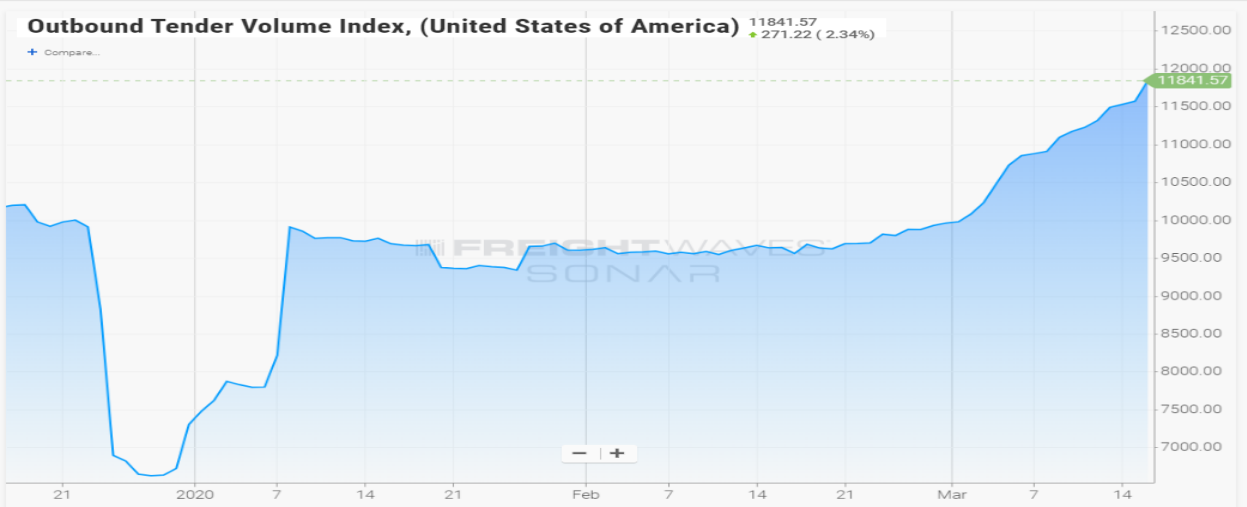
Most disasters are experienced as a single "shock" or widely separated shocks. **This pandemic is being experienced as a series of shocks – confirmed clusters, deaths, financial gyrations, et cetera – and accumulated stress**. There is psycho-social stress. There is also stress on production, transportation, and transaction systems that are being pushed to capacity over extended periods of time. Sustained stress produces fatigue that can precipitate system-failure.

To avoid being surprised by failures and to prevent when possible, **Ecosystem Assessments for this pandemic event will focus on large scale freight flows**. By tracking national and regional freight movement (and non-movement) the Ecosystem Assessment offers a rough "blood pressure test" for supply chain fitness. Particular attention will be given to changes in flow velocity.

The Ecosystem Assessment team (EAt) was reactivated on March 17 and is finalizing persistent indicators. Following are snapshots of four promising candidates. On a recurring basis the EAt will complement its national overview with closer examination of selected regional freight flows. Indicators are intended to inform a strategic sense of freight flows and potential bottlenecks. Early identification and mitigation of bottlenecks is the strategic purpose.

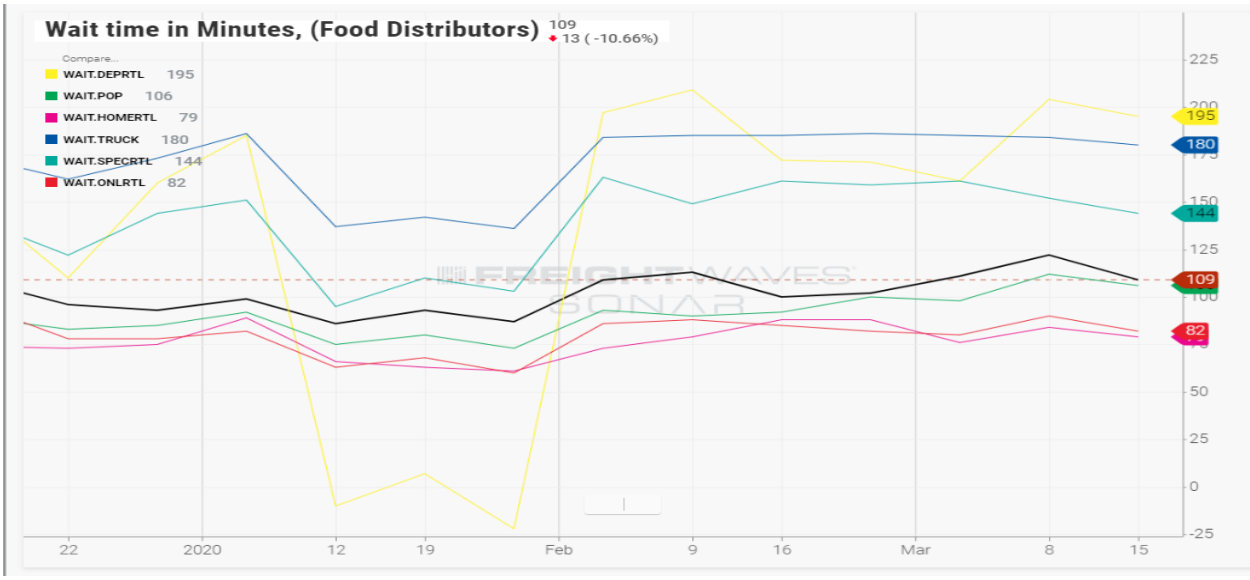
Freight Volume

Nationwide freight volumes were seasonal and flat into late February but beginning about February 24 started climbing and on March 16 surged to a 52-week high. This is atypical for this time of year.



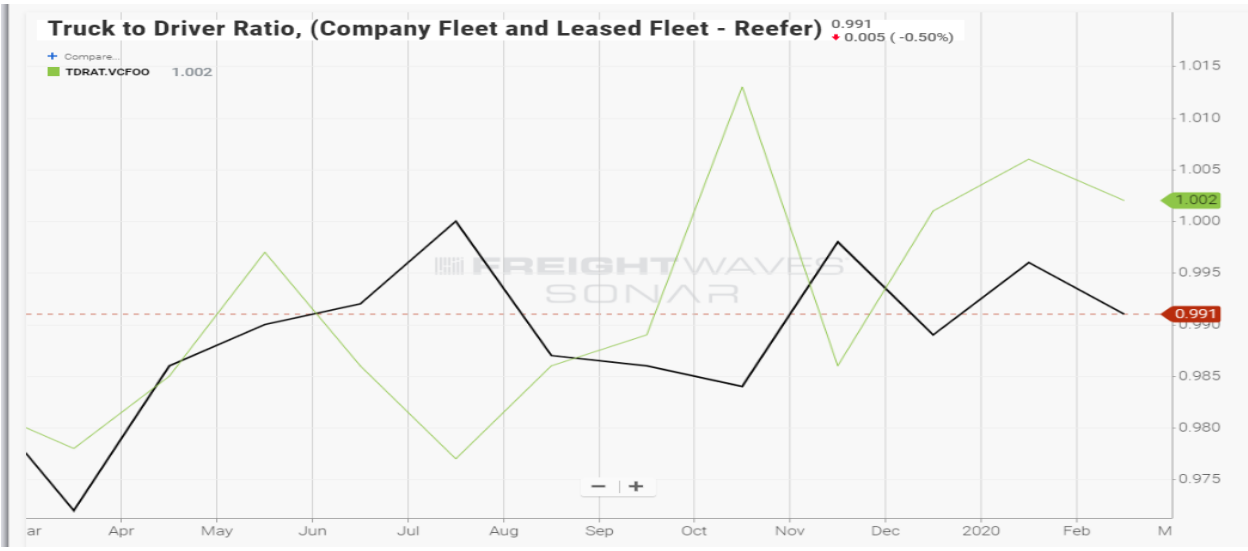
Freight Velocity

Reports of long wait times for inbound grocery are not yet reflected in available data-streams. The bold black line reflects percentage change in “normal” truck wait-times at food-related distribution nodes.



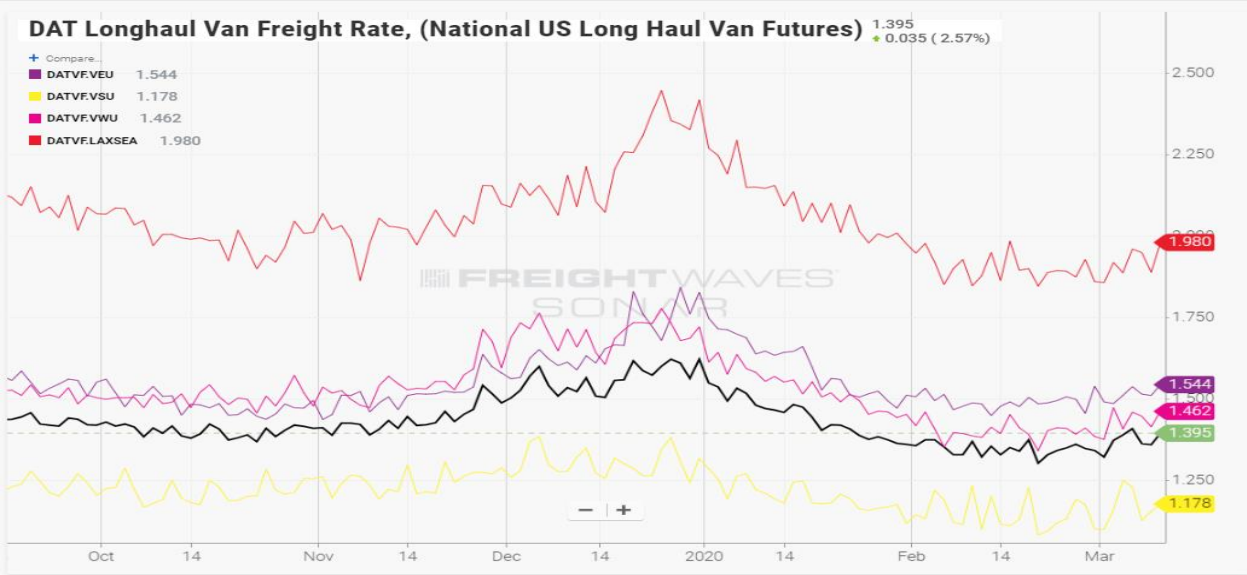
Utilization of Current Freight Capacity

A 1:1 ratio indicates that every tractor and every driver is matched and active. Anything less indicates unseated tractors and less than full-capacity utilization. The count of drivers included in this survey of selected market-leaders includes part-time employees and independent contractors counted on a Full Time Equivalent basis. The current ratio is close to its long-time average. This industry-wide average can obscure sector specific (e.g. cold chain, grocery, etc.) disequilibrium.



Anticipated Freight Volume

Late winter is typically a very slow freight season. Not this year. Seasonally soft – even depressed – post-holiday rates have strengthened considerably since the beginning of March, implying that the market anticipates current increased demand for trucking will continue.



Preliminary Strategic Assessment

From non-freight sources of data and information, it is well-established that consumer demand has recently been exceptionally high – especially for grocery, household cleaning, and some healthcare products. Considering the previous data indicators in the context of other available data and information: **current freight volume is above average, freight velocity is near normal, capacity utilization is near normal with additional capacity remaining, freight markets are anticipating continued strong volume**. Available data-streams – and market observations – also suggest that freight flows have surged even more in just the last two days. Data capture and reporting can lag real-time volumes and related congestion.

Nonetheless, current data streams indicate that on a nationwide – network-wide – basis, **freight flows are healthy**.

Ecosystem Assessments are meant to evaluate the current and anticipated ability of demand and supply networks to support the fundamental needs of large populations during a major disaster. In this crisis, at this time, freight flows in the United States are sufficient for this purpose. Moreover, the immediate threats to Supply Chain Resilience are the result of high-anxiety purchases and purposefully imposed constraints (e.g. school and workplace closings), not physical destruction or structural disruption of supply chains or enabling systems.