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US freight after COVID-19: What's next?

The pandemic has scrambled customer demand, further muddying a complicated picture. New research highlights four forces to watch.

by Dilip Bhattacharjee, Rebecca Gould, Ezra Greenberg, and Matthew Kandel



These are difficult times for freight transportation and logistics in North America. Public-health measures to control the COVID-19 pandemic have reduced economic activity, and economic-policy countermeasures have gone only so far. US GDP declined by 1.2 percent in the first quarter of 2020, and unemployment rose to 14.7 percent in April.¹ McKinsey expects second-quarter US GDP to fall by an additional 8 to 13 percent depending on which economic scenario plays out. With no clear time line for the lockdown and other restrictions to end, freight companies are responding to the immediate crisis by preserving cash, creating safe workspaces, adjusting the size of the workforce to meet current demand, and providing humanitarian aid.

However, not all carriers have been affected equally. In the crisis, demand has been volatile, spiking or plummeting by mode and customer profile. Compared with last year, trucking volumes initially increased by about 30 percent in 2020 as a result of panic buying, then dropped markedly, and are now ticking back up again. Railroad volumes declined by 20 percent and have not recovered. Last-mile deliveries have surged more than ten times over, but ocean shipping is down by 25 percent.

This pandemic-driven volatility follows a puzzling performance for freight in 2019: despite strong economic activity, demand and pricing dropped by as much as 30 percent on the spot market, thousands of truck carriers went bankrupt, intermodal demand plunged, and the number of rail carloads declined by 12 percent.

Many freight companies are asking what comes next. Will all modes rebound when the economy starts growing again, or are the divergences of 2019 and early 2020 a sign of things to come? To find out, we looked deep into the data on intra-US freight in key transportation modes (road, rail, and water) for the past three decades to understand how each emerged from past recessions and the economic forces that really mattered for recovery.

What we found may be surprising: there is no economic rule of thumb that freight growth will track economic growth after a crisis (Exhibit 1). Following the 2009 recession, freight indeed grew along with the economy. But the economy grew rapidly in the years after the dot-com crash and 9/11—while freight volumes stagnated. Going back further to the recession of 1990–91, freight growth tracked the economy for a couple of years as the recession ended, only to slow down significantly soon thereafter.

That on-again but mostly off-again relationship is captured by our measure of “freight intensity”: the ratio of freight to the value of all goods and services produced by the nation’s economy.² As Exhibit 1 shows, freight intensity has fallen steadily since 1990. It seems there is no natural law governing the relationship between freight and economic activity.

The four forces

Instead, our research indicates, four structural factors determined the path of freight growth in the US economy after each crisis: a secular shift from freight-heavy to freight-light economic activity, the globalization of North American supply chains, the rise of e-commerce, and the growth of energy production in North America. In this report, we review these forces and use them to understand how companies can anticipate the course of freight demand in the years to come when the COVID-19 pandemic has—we hope—receded.

The transition to a ‘freight light’ economy

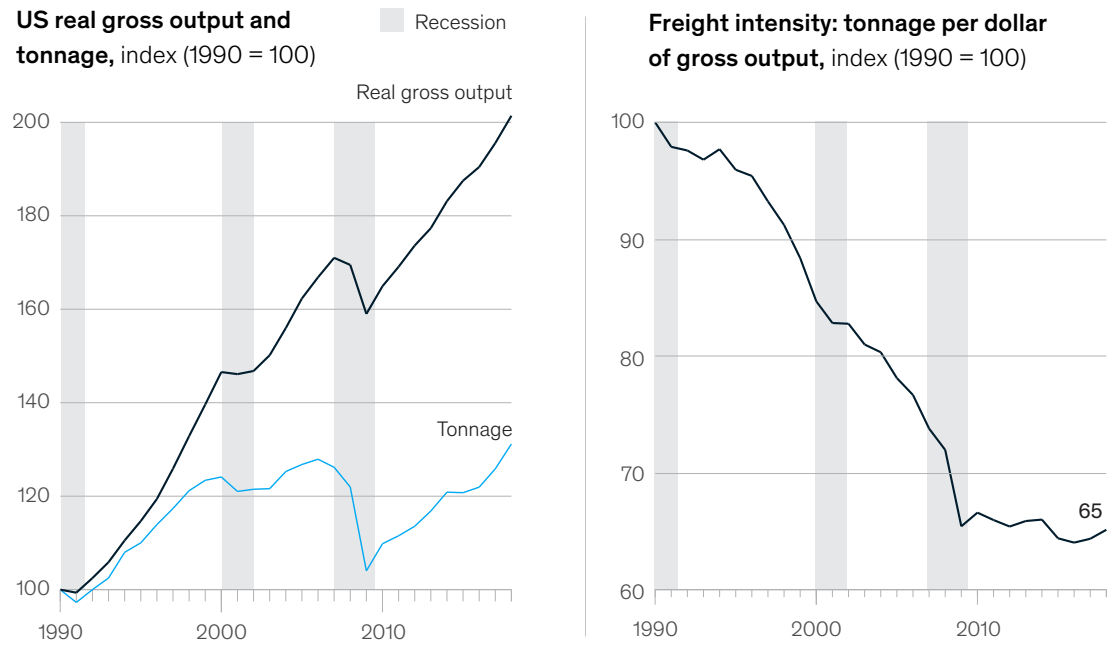
In the past 30 years, US consumption habits have expanded to include a host of services and experiences that have grown more rapidly than spending on traditional goods. Together, private industries producing services for consumers and business rose to 65 percent of the economy in 2019, up 12 percentage points since 1990.

¹ The 1.2 percent decline in first-quarter GDP is equal to a 4.8 percent decline when measured at an annual rate as officially reported by the US Bureau of Economic Analysis.

² Gross output is the value of all goods and services produced by a nation’s economy. It is measured as total industry sales including sales to final users (GDP) and sales to other industries (intermediate inputs used in the production of other goods).

Exhibit 1

US freight has not kept up with the broader economy.



Source: American Trucking Association; Bureau of Economic Analysis; Bureau of Transportation Statistics; Federal Highway Administration; Federal Reserve; McKinsey analysis

US demographics changed markedly over this time: the proportion of people older than 45 rose from 31 percent in 1990 to 42 percent today. Older cohorts consume more services such as healthcare and financial services than younger people do; for example, older adults might buy three to five times as much healthcare per person. Thanks in part to this demographic shift, healthcare alone has grown by four percentage points as a share of total consumer spending. At the other end of the age spectrum, the millennials and Generation Zers have also developed preferences for services. They spend 47 percent of their food budgets eating out. Sixty percent buy \$4 coffees, and 73 percent spend money on live music and sports events—compared with 29 percent and 55 percent, respectively, of baby boomers.

Over each of the past three recovery cycles, the share of services has ticked up in the years following the recession's end—by six percentage points after the recession of the 1990s, one point in the 2000s, and 5 points in the 2010s (Exhibit 2). If the pattern repeats after the COVID-19 crisis, there will be an additional drag on freight growth.

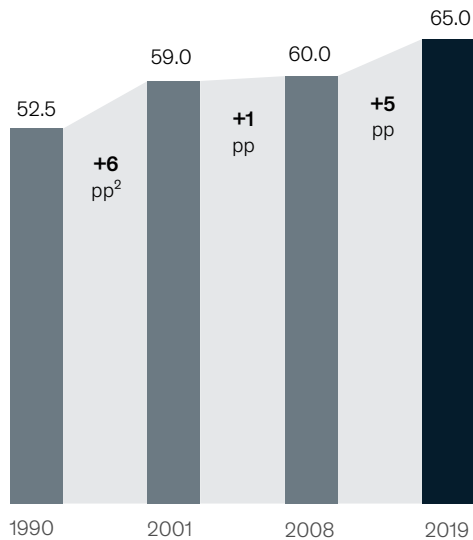
The globalization of supply chains

The contours of future global trade have been in flux since the 2009 recession, and became even less certain over the past three years as the US government pursued new trade terms with its partners across a wide variety of goods and services. During the COVID-19 crisis, critical medical-supply shortages, including some caused by the export bans of foreign governments, have raised further questions about the possibility of near-shoring or reshoring production. What effect could this development have on US freight volumes?

Exhibit 2

The freight-light portion of the US economy has grown during each previous recovery from a recession.

Freight-light share of US gross output,¹
% (3-year moving-average)



¹Gross output is the value of all goods and services produced by the nation's economy. It is measured by total industry sales including sales to final users (GDP) and sales to other industries (intermediate inputs used in the production of other goods).

²Percentage-points.

Source: Bureau of Economic Analysis; McKinsey analysis

History again provides some guidance. Global trade flows have grown by an average of 1.4 times the rate of real GDP for the past 150 years (Exhibit 3). This period includes the golden era of globalization, from 1870 to 1913 (when world trade rose 1.6 times), as well as the tumultuous period of the two world wars and the Great Depression (0.6 times).

To be sure, this global-trade multiplier has fluctuated at times. Many current business leaders grew up during a time of breakneck growth for trade (at more than twice the rate of GDP from 1990 to 2008) and consider that normal. Our research indicates that this roughly 20-year period actually is a historical

aberration caused by several one-time shifts in trade structures—including the development of advanced communications networks, the General Agreement on Tariffs and Trade (GATT) Uruguay round; the creation of the North American Free Trade Agreement (NAFTA), the Eurozone single currency area, and the World Trade Organization (WTO); and perhaps most important, China's accession to the WTO.

These changes led to the formation of new global supply chains: the United States and many other countries offshored production (especially of initial-stage and intermediate goods) to low-cost countries. From 1990 to 2007, imports to the United States from China rose to \$356 billion from \$16 billion, according to the International Monetary Fund; overall imports increased more than 4 times to \$2.2 trillion over this period. Offshoring led to fewer shipments of raw materials and intermediate goods within the United States and to lower inventory volumes (which fell by 1.3 percent and 4.2 percent a year, respectively, from 1990 to 2008). This development put downward pressure on intra-US freight volumes.

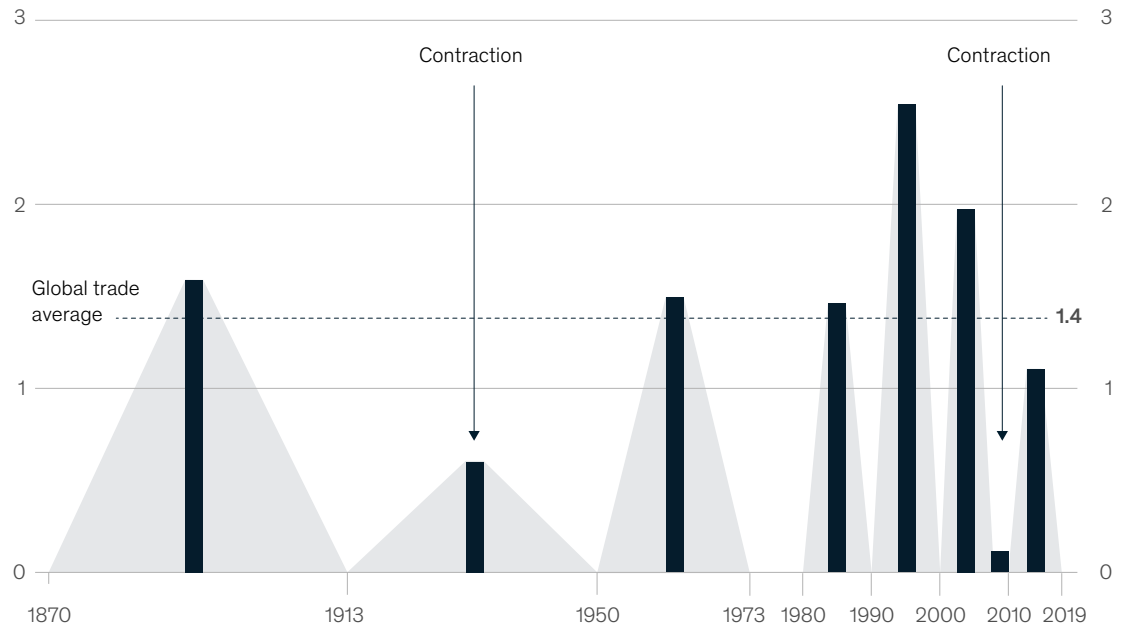
The 2009 recession ended these decades of rising trade among nations. The global-trade multiplier fell sharply at that time; at 1.1 times GDP growth, it remains below the long-term average. What's more, offshoring became less profitable as labor costs rose in Asia and improved manufacturing technologies cut domestic labor costs. The effects of globalization on domestic freight moderated.

The pandemic has caused another collapse in global trade. Its ultimate return to previous levels is unclear and could be affected by a reconfiguration of global supply chains, already underway because of the latest trade tensions; and new, pandemic-driven ideas about offshoring. US manufacturers could maintain the status quo, diversify away from China but still produce in East Asia, near-shore to Mexico or other neighboring countries, or reshore to the United States. Of these four potential scenarios, only reshoring would affect intra-US

Exhibit 3

History suggests that postpandemic, the trade multiplier will contract, as it did in the Great Depression and the global financial crisis, and then revert to trend.

A history of real trade in goods vs growth of real GDP, multiple (constant dollars and exchange rates)



Source: Maddison Project; Oxford Economics; McKinsey analysis

freight volumes, by increasing raw-material and intermediate moves. Some healthcare manufacturing may return to the United States, but that is less likely in other industries.

The rise of e-commerce

E-commerce has been a major driver of supply-chain changes in the past two decades, growing from 1.3 percent of retail sales in 2000 to 14.2 percent in 2019.³ As consumers became more accustomed to buying everything from clothing to furniture online, leading companies developed new supply chains to reduce arrival times, from a week or more to same-day deliveries. This is not only an Amazon story—many other retailers have matched each service improvement.

These changes atomized traditional retail supply chains as the emphasis shifted toward small deliveries to homes. Recently, retail shipments under 50 pounds (suitable for parcels) have increased by nearly 5 percent a year while those over 1,000 pounds have stagnated. Shorter delivery times also created a need for more warehouses—often smaller than they had been in the past and located closer to the homes of consumers. Average warehouse sizes have fallen by 9 percent since 2016 and trucks’ average length of haul by 25 percent over ten years.

Meanwhile, reverse logistics has become an increasingly important part of supply chains; consumers return about 30 percent of online sales, versus about 8 percent for brick-and-mortar locations.

³ US Census data for retail sales excluding food and drinking places, and automobiles and parts.

COVID-19 has prompted the even faster adoption of e-commerce, for consumers have had to shift nearly all nongrocery purchases (and even many of them) online. While some of these will probably shift back to in-person transactions as the economy reopens, two data points indicate that e-commerce as a whole has runway to continue growing. First, international comparisons suggest, for example, that by Chinese standards—25 percent of retail sales—e-commerce is actually underpenetrated in the United States. Second, the growth of e-commerce did not slow down after 9/11 or the global financial crisis (Exhibit 4). The freight trends sketched above should continue in the years ahead.

Growth in energy production

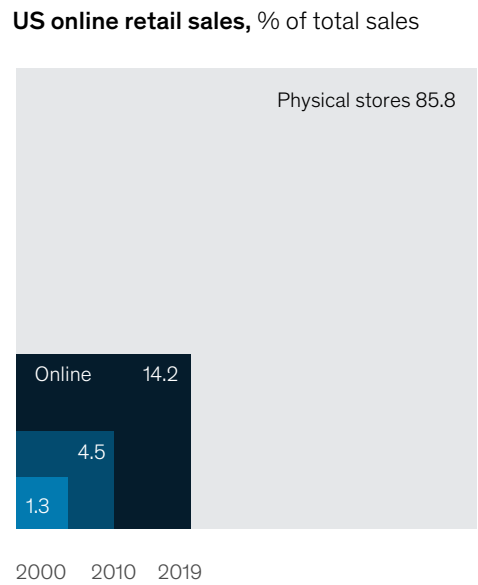
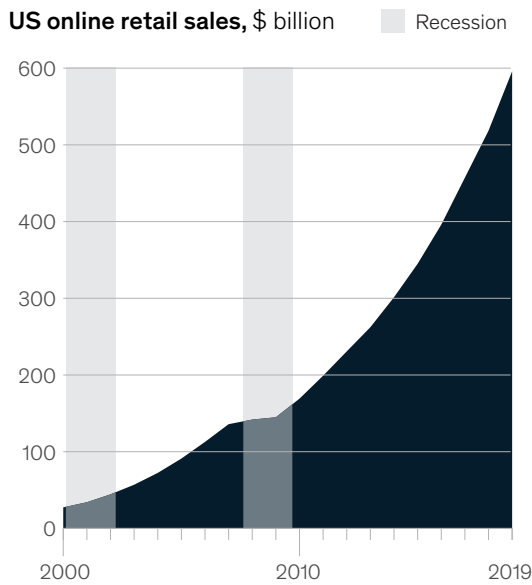
After the global financial crisis, the US energy sector—particularly oil and gas—significantly boosted domestic freight tonnage. By 2019, fracking had lifted US production of oil and other petroleum liquids to 19.5 million barrels per day, the highest in the world. This output, plus new demand for process

inputs such as sand and water, boosted truckload carriers, pipelines, and inland waterway traffic (for example, in the Gulf of Mexico). Meanwhile, coal production began a long decline—from nearly 1.2 billion tons in 2008 to just 756 million tons in 2018. Railroads were most exposed to the associated freight freefall: coal volumes fell by roughly ten percentage points as a share of carloads.

Several factors—including environmental regulations, shifting consumer preferences, improvements in the cost curve of competitive renewables (such as solar), and an unfavorable long-term cost structure—argue against a return of coal in the post-COVID-19 world. On the other hand, future oil and gas volumes represent a wildcard. Today, these two energy sources struggle with an approximately 30 percent decline in demand. Growth will resume at some point, but its timing and strength are going to depend heavily on the shape of the US economic recovery, the global economy, and other macro forces.

Exhibit 4

US e-commerce growth has been undaunted by recession.



Note: Retail sales excluding food and drinking places, and automobiles and parts.
Source: US Census; McKinsey analysis

Framing the next recovery

To understand the likeliest course of freight in the upcoming recovery, companies should consider, first, the broader economy. McKinsey research indicates that the path of a general economic recovery will depend on the effectiveness of public-health responses to the pandemic including battling the possible resurgence of the virus, government's economic-policy response, and the ability to reinstate business and consumer confidence. In addition, freight companies must consider how the four structural factors are likely to play out (Exhibit 5):

- The shift from a freight-heavy to a freight-light economy will probably continue. This is a long-term trend, and we have seen freight-light shifts in past recoveries.
- Trade flows will bounce back and grow at least in line with GDP, but the revival will be uneven across sectors and commodities.

- The adoption of e-commerce is likely to continue accelerating.
- There is a wide band of uncertainty about when US energy production will return to growth and how strong the return might be.

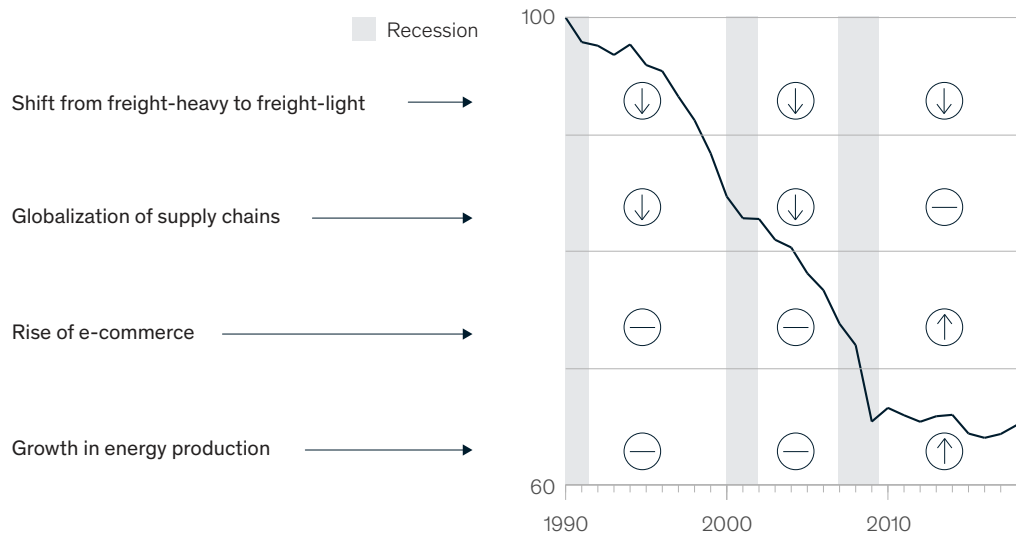
These trends will probably once again play leading roles in freight's recovery from the current recession. Over time, COVID-19 may set in motion new forces that could also affect the freight recovery. Translating all these trends, old and new, to actionable, company-specific insights calls for a nuanced assessment of the marketplace: for example, we expect some commodities to return faster than others. Some modes naturally have a better position to take advantage of trends. Pockets of growth may yet emerge in unexpected sectors.

Commodities with a number of positive demand factors—such as increased consumer purchases

Exhibit 5

Four structural factors have had varied effects on tonnage, and on freight intensity, following previous recessions.

Effects of structural factors on freight tonnage per dollar of gross output, index (1990 = 100)



Source: American Trucking Association; Bureau of Economic Analysis; Bureau of Transportation Statistics; Federal Highway Administration; Federal Reserve; McKinsey analysis

during the crisis, national prioritization for production, and relevance for e-commerce—will be the first to return to growth. Agricultural products and food top the list (Exhibit 6). Other sectors, such as electronics, will see a modest rate of recovery, in line with the broader economy. The electronics sector’s share of freight tonnage will be held back somewhat because a shift to lighter goods will probably offset the positive impact of e-commerce.

Finally, freight tonnage for some commodities, like automotive, will probably return slowly, for reasons such as declining consumer demand for nonessentials. The recovery path for a specific freight carrier will depend heavily on its particular mix of customers and products.

Each mode will probably experience a different kind of recovery, based on its commodity exposure. In any economic-recovery scenario, some modes grow faster after a crisis than others, thanks to their commodity-mix profiles. Exhibit 7 shows the expected effect on the main modes of transport. Freight companies should monitor the evolving macroeconomic scenario and analyze the granular micromarket recovery of their own commodity exposures in specific lanes and channels.

With the growth trajectories of commodities and modes in mind, companies are asking how to capture the growth of faster-to-return commodities and how to navigate the challenges of the slower-growth parts of their customer portfolios. To build or

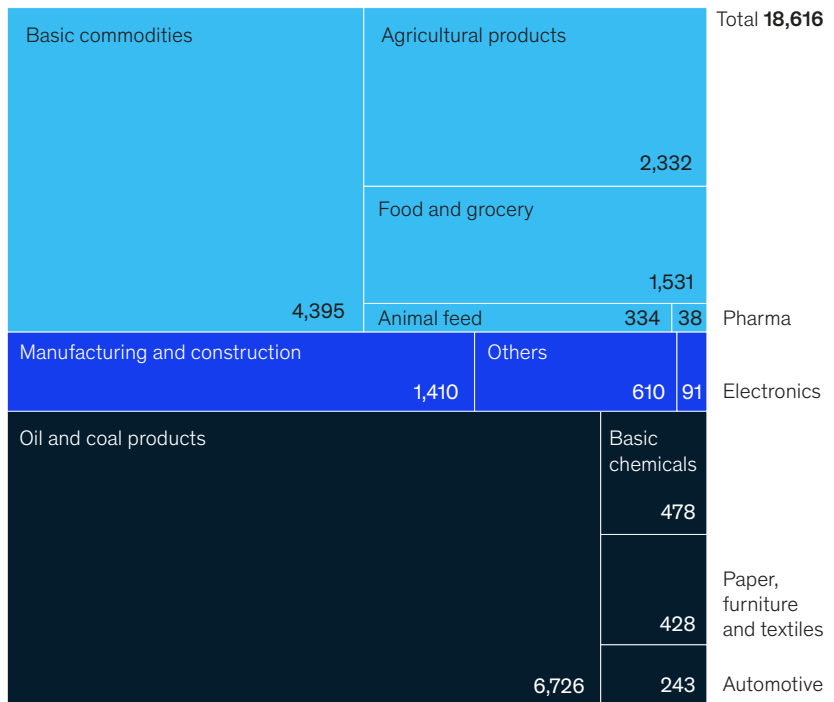
Exhibit 6

Some commodities will likely return faster than others.

US freight by commodity type in 2018, million tons

Key factors impacting COVID-19 recovery

- Faster to return
 - ⬆ Increased demand for consumer essentials
 - ⬆ National priority
 - ⬆ Acceleration of e-commerce
- Neutral
 - ⬇ Lower income and consumer demand for nonessential goods
 - ⬆ Potential reshoring
- Longer to return
 - ⬇ Slowdown in US oil and gas production
 - ⬇ Declining demand for nonessentials
 - ⬆ Potential reshoring



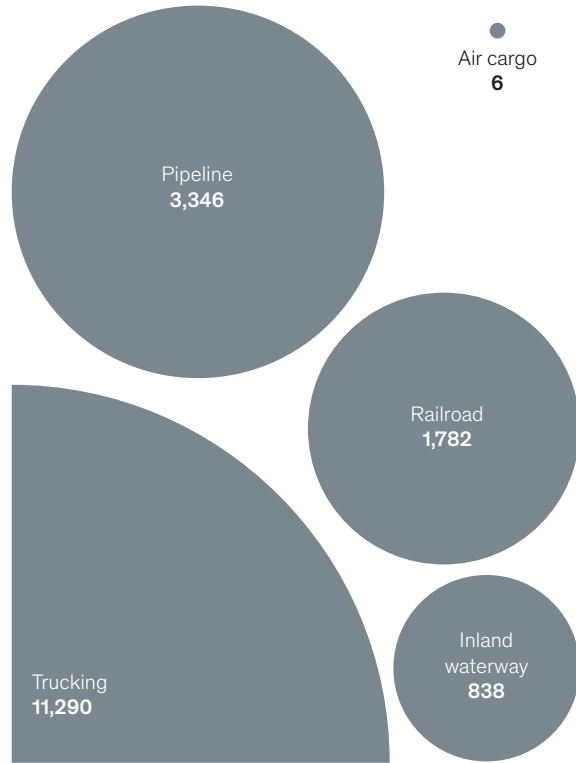
Note: Nonfood basic commodity includes stone, gravel, minerals; manufacturing and construction includes metal articles, machinery, plastics, rubber; other includes waste, scrap, and unknown.

Source: Freight Analysis Framework.

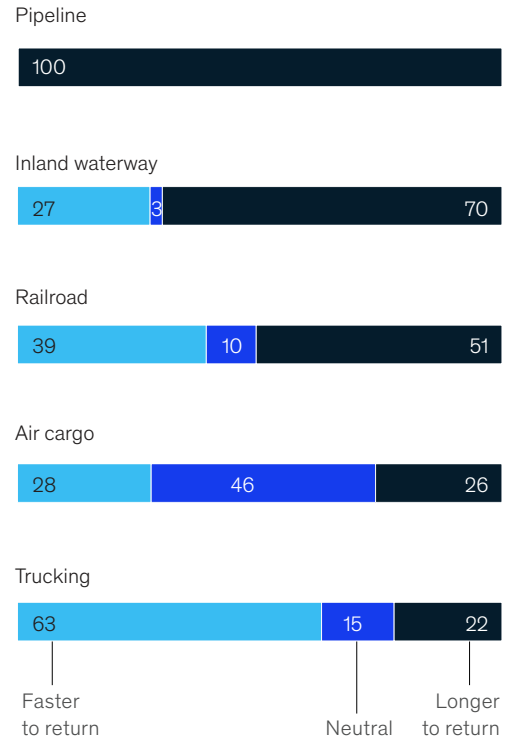
Exhibit 7

Recovery in each mode will depend on its commodity mix.

2018 US freight, by mode, million tons



Exposure to commodities by anticipated recovery time, % share



Source: Freight Analysis Framework; excludes multiple-modes and mail, others and unknown

The recovery path for a specific freight carrier will depend heavily on its particular mix of customers and products.



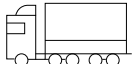
maintain market leadership in the coming recovery, now is the time for freight companies to consider productivity, growth, and their mix of customer commodities. Exhibit 8 lays out the questions that executives must answer to assess the readiness of their companies to participate in the next recovery.

Freight companies thinking through what to expect as the economy emerges from recession should develop a perspective on how each of the four factors will evolve: Continue on the pre-COVID-19 trajectory or change course? There is no one right answer for every company. But a clear strategic-evaluation framework and perspective on the underlying trends can help companies anticipate the coming challenges and opportunities in freight markets.

Exhibit 8

Freight CEOs can assess their companies' readiness for recovery.

Are you ready for recovery?

 Railroad	 Air cargo	 Trucking
<ul style="list-style-type: none"> ● If rail has higher headwinds than other modes, how much more productivity would be needed to maintain total-return-to-shareholder performance? ● Would rail need to do more after the current precision-scheduled-railroading wave? ● How can rail innovate to make intermodal offerings attractive? ● What opportunities could (and should) railroads tap into (eg, energy, e-commerce)? ● What opportunities exist to drive growth in noncore adjacencies? 	<ul style="list-style-type: none"> ● What commodities are primed to increase their air-cargo usage in the coming months? And which ones could be long-term users (in new normal)? ● How effective are the salespeople, forwarders, and other partners at managing rapid change (eg, new pricing, damaged supply, volatile demand)? ● What added options exist to increase short-term supply given current passenger-airline context (eg, negotiating access with airports, purchasing/renting grounded assets)? 	<ul style="list-style-type: none"> ● Is the sales force well positioned with the right capabilities to go after high-growth commodities (eg, healthcare, food and grocery)? ● How can the cost structure be varied (eg, fleet, labor) given current oversupply in the market? ● What is the opportunity to accelerate market offerings tied to adjacencies (eg, e-commerce, last mile)? ● What is the opportunity to truly "clean sheet" the business model by accelerating digital and analytics (eg, digitizing customer channels, leveraging work-from-home staffing)?

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