

# Mapping the Industrial Recession

## Overview

Welcome to the first edition of Passport Research: Special Topics, a recurring series covering issues of current topical interest to Passport clients. In this week's report, we map aspects of the industrial recession.

U.S. industrial production continues to weaken as global demand for American products slows and businesses hesitate to make capital investments due to political risks around trade policy and federal elections.

In October, U.S. industrial production fell 0.8% y/y after declining 0.3% in September. Manufacturing production, a major component of industrial production, fell 0.6%, driven by declines in machinery, oil and gas, chemicals, automotive, and paper products.

In this report, we visualize the industrial recession across space in maps generated by SONAR. Railroad data produced by the Association of American Railroads on a weekly basis is one of the best snapshots of current North American industrial activity. In what follows, we've collated government industrial production data with railroad commodity volumes to map the regions of the country currently experiencing industrial weakness.

Weakness in forest products hit Maine and the Southeast hard. The American petrochemical industry is concentrated on the Gulf Coast, although shippers like BASF, Eastman, and Dow have plants across the country. Like Kansas City Southern, the Union Pacific ships auto parts south into Mexico and finished autos north into the U.S., though it also has exposure to Midwestern assembly plants.

## Global Industrial Production YOY Change

|                       |       |
|-----------------------|-------|
| United States         | -1.1% |
| China                 | +4.7% |
| Japan (Sept)          | +1.3% |
| Germany (Sept)        | -4.3% |
| United Kingdom (Sept) | -1.4% |
| France (Sept)         | +0.1% |

## U.S. Industrial Production Oct. YOY Change

|                                  |        |
|----------------------------------|--------|
| Automotive                       | -11.9% |
| Oil & Gas Drilling               | -19%   |
| Chemicals (Nondurable materials) | -1.4%  |
| Machinery                        | -4.5%  |
| Paper (Nondurable materials)     | -4.9%  |
| Primary Metals                   | -2.2%  |

## U.S. Railroad Volumes by Commodity YTD

|                       |        |
|-----------------------|--------|
| Chemicals             | -0.2%  |
| Petroleum Products    | +14.1% |
| Stone, Sand, & Gravel | -8.2%  |
| Forest Products       | -4.4%  |
| Metals & Ores         | -5.3%  |
| Motor Vehicles        | -3%    |

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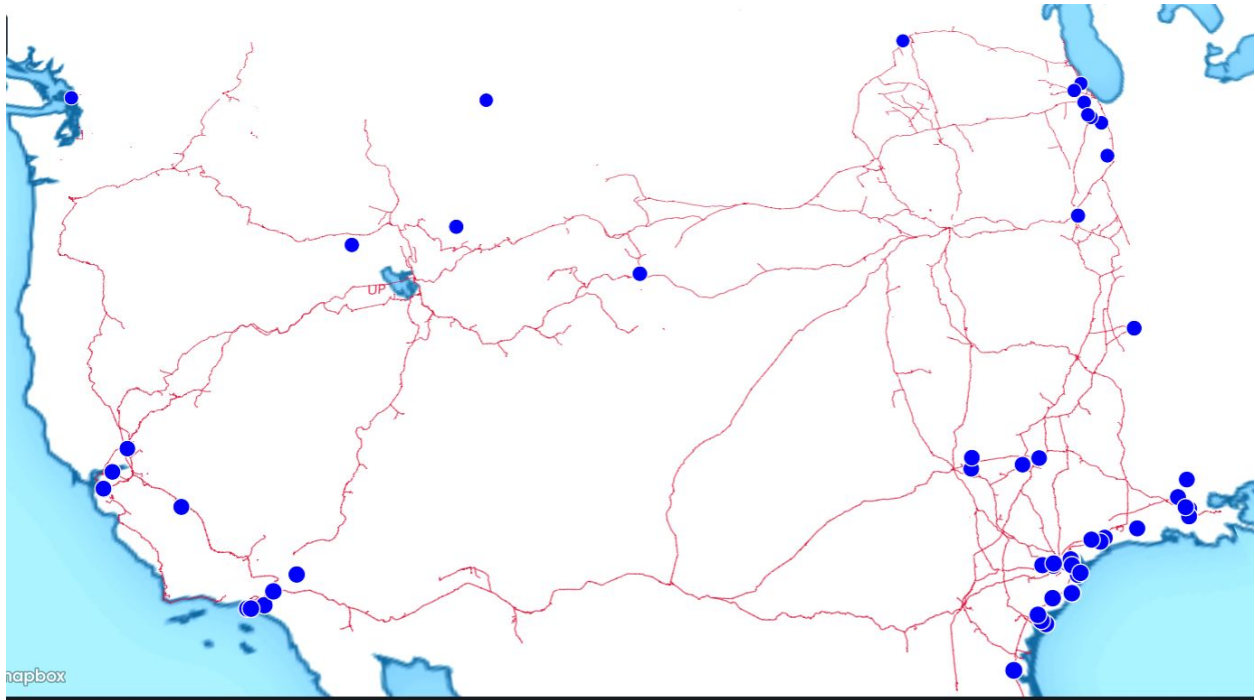
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**Chemicals**



(Map: FreightWaves SONAR. Major chemical plant locations overlaid onto the Union Pacific network)

Chemical production in the United States is structured regionally and seasonally. On the railroads, carloads of chemicals tend to accelerate through the first half of the year before fading in the second half, typically peaking in April or May. Chemical volume seasonality is driven by Midwestern agricultural demand for fertilizers and pesticides.

On the Gulf Coast, petrochemicals like olefins and aromatics, as well as plastic resins and synthetic rubber dominate volumes. Union Pacific ships chemicals into the Gulf Coast, then moves plastic pellets from the Gulf Coast to ports in Southern California where the plastic feedstock is sent to China. Eventually the plastic returns to American shores as consumer goods.

Chemical products account for 5.27% of U.S. industrial production while base chemical materials contribute 6.03% to U.S. industrial production. So far this year, railroad chemical carloads are down 0.2%. Of the American railroads, Union Pacific has the most exposure to chemicals (11.2% of all carloads); its volumes are essentially flat this year at 0.3% year-to-date growth. In the past four weeks, UNP's chemical carloads are down 3.6% on a year-over-year basis. Western competitor BNSF's chemical volumes are down 5% over the same period.

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## Automotive



(Map: FreightWaves SONAR. Automotive production facilities overlaid onto Union Pacific network)

Automotive production has been the biggest loser in industrial production. Automotive production represents 5.61% off all industrial production, making it the fourth largest input that is factored into industrial production. Automotive production is currently down 11.85% year-over-year in October due to United Automobile Workers members at General Motors facilities going on strike in mid-September.

Automotive accounts for 5.3% of Union Pacific's carloads. On a year-to-date basis, UNP's automotive carloads are down 4.7%, but the downturn was accelerated by the strike. Over the past four weeks, UNP's auto volumes are down 12.8%.

The General Motors strike has had a large impact on industrial production. Nearly 48,000 workers were on strike for 6 weeks. Not only did the strike cost GM nearly \$2B in lost production, but it also cost the workers \$1B in wages.<sup>1</sup> The strike impacted GM's manufacturing facilities along with distribution centers which are also unionized. According to the Federal Reserve, the strike was responsible for a 0.7% decline in durable goods for the month of September.

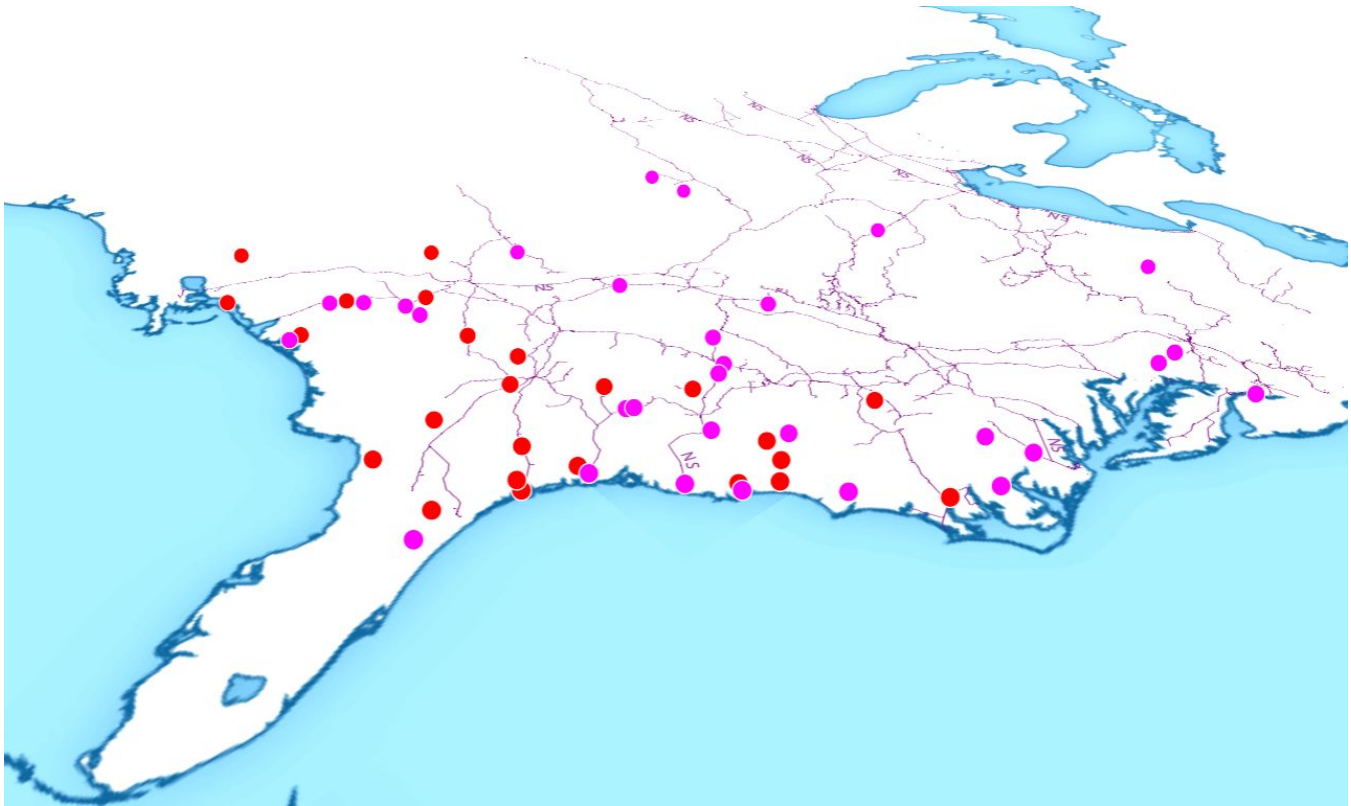
Further, there are significant secular risks to transportation and logistics companies that are overexposed to the automotive supply chain. 'Peak car' is not just a theory: car miles driven per potential driver peaked in 2004 in the U.S. and have declined nearly every year since. The age of the average car and light truck in the U.S. is now 11.8 years, up from just under 9 years in 2000 and under 7 years in 1980. Miles driven per vehicle has also fallen since 2004 and are now at 1992 levels.

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<sup>1</sup> "The GM strike has officially ended. Here's what workers won and lost." Vox. October 25, 2019.

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## Forest Products



(Map: FreightWaves SONAR. Paper mills (purple) and timber mills (red) overlaid onto Norfolk Southern network)

In mapping the industrial recession, it is important to look not only at what segments of the industrial economy are being hurt the most but also the segments that are the most impactful for the overall economy. In the most recent data, it is apparent that timber products have been a drag on the industrial economy. In non-durable manufacturing, paper is the biggest contributor to the downward momentum in the economy followed by plastics and rubber products and chemicals.

Forest product volumes are down across most of the North American Class 1 Railroads. Year-to-date industry-wide volumes are down 5.3% y/y, for a multitude of reasons. In particular, Norfolk Southern's forest products volumes are down 11.3% in the past four weeks.

First, in 2018 the United States economy grew at a faster rate than it has been able to sustain this year. This resulted in an imbalance in supply that has left a glut of lumber in the market. This has resulted in a multitude of mill closures in the U.S. and Canada. As seen below, the price of lumber corrected harshly starting in the middle of 2018 and has been range-bound for most of the past year.

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(Chart: NASDAQ. Lumber futures prices in U.S. dollars per thousand board feet are displayed).

Trade tensions have drastically impacted the timber markets. In July 2018, the United States imposed tariffs on a multitude of Chinese products which resulted in China quickly retaliating with tariffs on U.S. goods, including numerous timber products. China is the biggest export market for U.S. lumber. At the time of the tariffs, China accounted for roughly half of all lumber exports from the U.S. In the twelve months after the tariffs were announced in July, 2018, Chinese imports of U.S. lumber are down \$615 million according to the American Hardwood Export Council. .