OXFORD ECONOMICS

RAIL SUPPLY INDUSTRY:

MANUFACTURING AND SERVICES KEEPING THE AMERICAN ECONOMY ON TRACK

JANUARY 2023

RAILWAY SUPPLY INSTITUTE

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Railway Engineering-Maintenance Suppliers Association (REMSA) was created in 1965 by the merger of the Association of Track and Structure Suppliers and the National Railway Appliances Association, two long-standing organizations in the railroad maintenance-of-way industry. The association represents companies and individuals who manufacture or sell maintenance-of-way equipment, products, and services, or are engineers, contractors and consultants working in construction and/or maintenance of railroad transportation facilities. REMSA members constitute a large part of the maintenance-of-way industry. The association sponsors the largest exhibit of maintenance-of-way equipment, products and services in the United States. REMSA members exhibit rail and track products, track maintenance equipment and services, safety devices and software that enables the railroad industry to work smarter.

RTA Railway Tie Association

The Railway Tie Association (RTA) was organized in 1919. Predecessor groups, dating back to the late 1800s, including The National Association of Railroad Tie Producers, were formed to support the railroad tie industry and to preserve forests through conservation. The Association is involved in all aspects of the crosstie industry and ongoing activities such as sound forest management, timber resource conservation, timber processing, wood preservation, sustainability, recycling, industry economics and statistics, and worker safety. The purpose of the RTA is to keep wood crosstie markets strong and sustainable.


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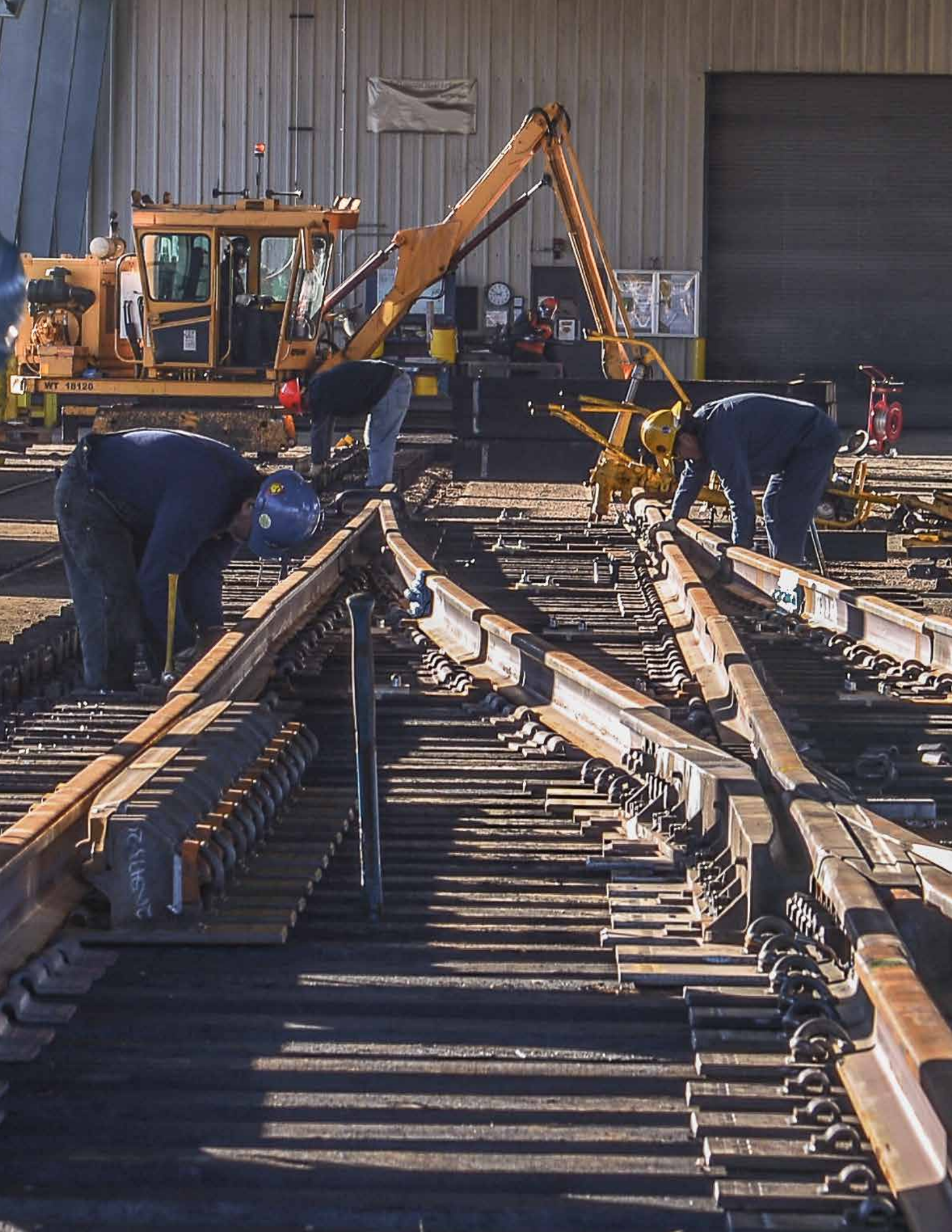
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EXECUTIVE SUMMARY

The rail supply industry—the businesses behind the rail transportation industry that provide the necessary goods and services to keep the US railroad network running—plays an essential and powerful role in driving in the United States economy. **In 2020, the rail supply industry directly employed almost 240,000 workers, who directly contributed $27.7 billion of value-added economic activity (GDP) across the US.** But this direct economic activity is only part of the industry's full economic footprint.

Rail suppliers enable the rail transportation industry to operate by manufacturing railcars and locomotives, and critical rail infrastructure such as signals, rail ties, and railway maintenance equipment. Key segments of the rail supply industry include:

- Railcar ("rolling stock") manufacturers, which build the passenger, freight, locomotives and other railcars that travel on the nation's rails;
- Railcar lessors, which own and lease much of the rolling stock in operation;
- Rail parts manufacturers;
- Maintenance-of-way specialists, which manufacture the specialty tools used to keep the rail network running; and
- Rail tie manufacturers, which make the mostly wooden rail ties that support the metal rails, and which require regular inspection and replacement.

Rail suppliers also deliver secondary benefits that other modes of transportation cannot, such as **reductions in road congestion, highway fatalities, fuel consumption, greenhouse gases, cost of logistics, and public infrastructure maintenance costs.**

This report, commissioned by The Railway Supply Institute (RSI) and supported by the Railway Engineering-Maintenance Suppliers Association (REMSA) and the Railway Tie Association (RTA) was prepared by Oxford Economics, and examines the economic contribution that the rail supply industry makes to US GDP, employment, and tax revenues.

$75.8bn

Total GDP impact of the US rail supply industry in 2020.

682,426 jobs

Total employment impact of the US rail supply industry in 2020.

THE ECONOMIC IMPACT OF THE US RAIL SUPPLY INDUSTRY

In 2020, the US rail supply industry's total economic impact was **$75.8 billion of GDP, 682,426 jobs, $49.0 billion of labor income, and $15.5 billion in taxes.** These numbers combine the direct, indirect, and induced contributions of the sector's activities.

The **direct** contribution measures the GDP and employment of all business operations of the rail supply industry. In 2020, the rail supply industry's direct contribution was $27.7 billion of output and 239,272 jobs.

The **indirect** contribution measures the output and employment in the domestic supply chain that supports the rail supply industry. Rail suppliers purchase components, parts, and services from other companies, thus forming the supply chain. Rolling stock manufacturers, for example, purchase wheelsets from manufacturers of industrial wheels and train control and signaling systems from communications equipment manufacturers. They also purchase supporting services such IT or accounting. In 2020, the rail supply industry's indirect contribution to the US economy was $22.2 billion of output and 191,071 jobs.

The compensation paid to workers in the rail supply industry and its supply chain results in additional household spending. This additional spending supports additional output and jobs in different sectors of the economy. The **induced** contribution measures the output and employment supported by the spending of the workers from the rail supply industry and its supply chain. In 2020, the rail supply industry's induced contribution to the US economy was $25.9 billion of output and 252,082 jobs.

As the $75.8 billion total GDP footprint is 2.7 times the $27.7 billion GDP of the railway system itself, the GDP multiplier of the rail supply industry is 2.7. This means that every $100 of value-added output in the rail supply industry leads to $170 of additional value-added output in other industries due to the production in the supply chain and employee spending impact. This multiplier is similar to that of rail transportation, retail gasoline stores, and air transportation industries.

The rail supply industry has a jobs multiplier of 2.9. This means that every job in the rail supply industry supports 1.9 jobs in other industries. This puts it ahead of other US industries such as machine shops, truck transportation, and ferrous metal foundries.

The high number of induced jobs is the result of the above-average compensation in the rail supply industry. The average compensation in the rail supply industry is $91,263 per year, which is 34% higher than the national average across all industries ($67,872).

The rail supply industry contributes to the economies of all 50 states, but it had the greatest impact in Texas ($9.0 billion in GDP and 77,536 jobs), followed by California ($6.2 billion in GDP and 45,104 jobs), and Illinois ($5.7 billion in GDP and 46,908 jobs).

The direct, indirect, and induced economic activity supported by the rail supply industry generated over $15.5 billion in taxes at all levels of government in 2020. This number can be further divided into $6.9 billion paid in federal taxes and $8.6 billion paid in state and local taxes. Each job created as a result of the economic activity of the rail supply industry generated about $22,720 in additional tax revenue.

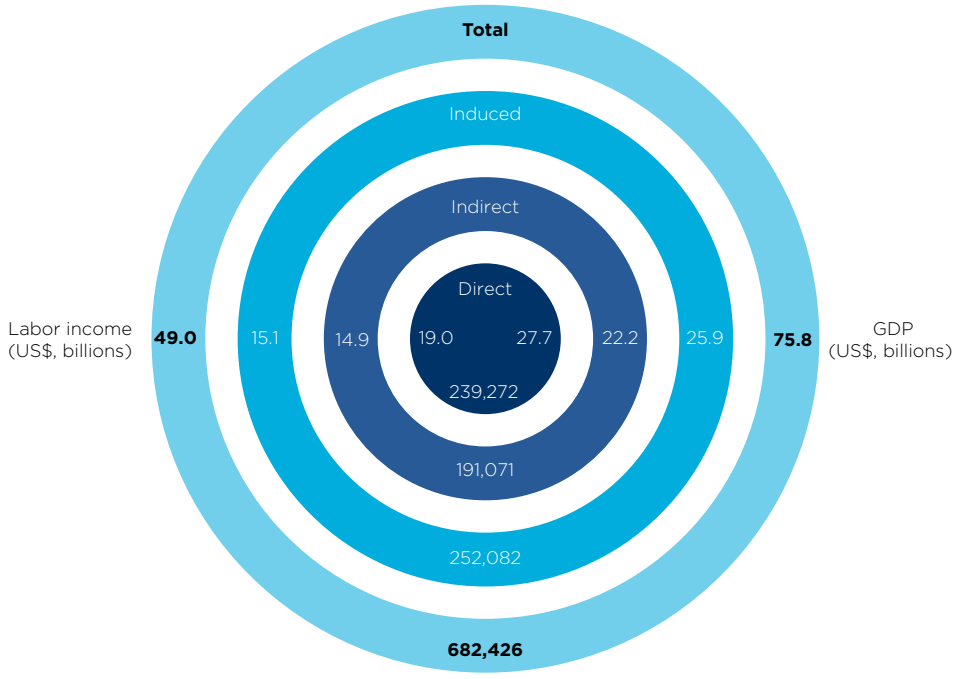
$91,263

Average employee compensation in the rail supply industry.

34%

higher than the national average.

Fig. 1: Summary of rail supply industry impacts



Source: Oxford Economics

Covid-19 Effects

The Covid-19 pandemic severely impacted the rail transportation industry. The temporary shock to the US economy reduced activity in the freight rail industry, which largely depends on demand in major commodity industries, such as coal, cereal grains, basic chemicals, and gravel. Rail equipment demand, in turn, largely depends on demand for freight rail services.

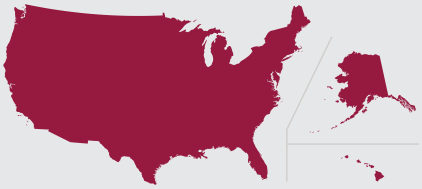
Prior to the Covid-19 pandemic, the volume of rail freight exhibited strong growth in 2017-2018, averaging about 4.5% per year. This decreased during the pandemic in 2019-2020 before picking up again in 2021. For context, after a dip in both rail transportation industry output and its operating expenditure during the Covid-19 pandemic in 2020 both measures showed a rebound in 2021 by 11.2% and 11.8% respectively.

Capital investment, however, can be lumpier and demand for rail supply products and services have yet to pick up after the Covid-induced downturn. Forecasts by FTR Transportation Intelligence show North American railcar deliveries expected to increase from a low of just under 30,000 in 2021 to just over 40,000 in 2023. As the US economy recovers from the impact of Covid-19, the rail transportation industry is set for a rebound that will fuel demand for railroad rolling stock and other rail supply industry products and services that will continue to deliver both economic and social benefits across the country.

UNITED STATES

THE ECONOMIC IMPACT OF RAILWAY SUPPLIERS

The railway supply industry helps to power the US economy.



2020 CONTRIBUTION TO US GDP

$75.78 billion

TOTAL IMPACT SUMMARY	
GDP	$75.78 billion
Jobs	682,426
Tax contribution	$15.50 billion
Labor income	$49.02 billion

682,426 jobs SUPPORTED IN THE US

Direct jobs
239,273

Indirect jobs
191,071

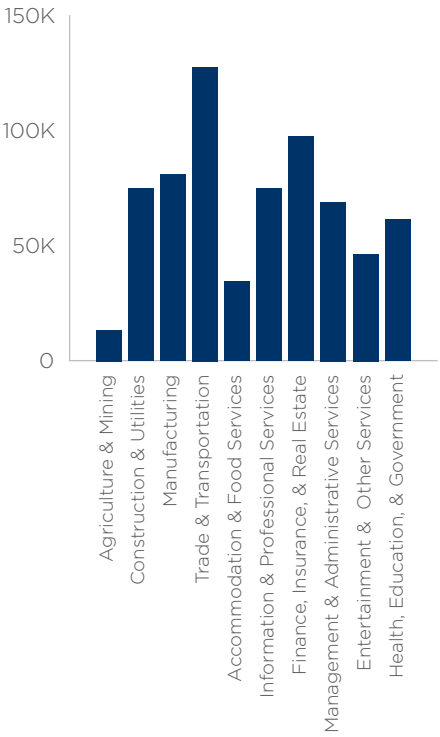
Induced jobs
252,083

Direct impacts represent the economic activity (jobs, GDP) taking place at rail suppliers themselves.

Indirect impacts represent the economic activity in rail suppliers' supply chains.

Induced impacts represent the economic activity supported as direct and indirect employees spend their wages on consumer goods.

TOTAL RAILWAY SUPPLY JOB IMPACT BY INDUSTRY IN THE US



$15.50 billion

Tax contribution
within the US in 2020

$6.89 billion **Federal**

$8.61 billion **State/local**

2.9 jobs

Total jobs supported throughout the US economy for every direct job in the nation's railway supply industry

The **Jobs multiplier** shows how many total jobs (direct + indirect + induced) in the economy are supported for each direct job.

$91,300

Average annual compensation of direct employees in the US railway supply industry in 2020

By comparison, the average employee compensation in the US was $67,900.

136,650

Miles of rail in the US

Source: Oxford Economics, IMPLAN

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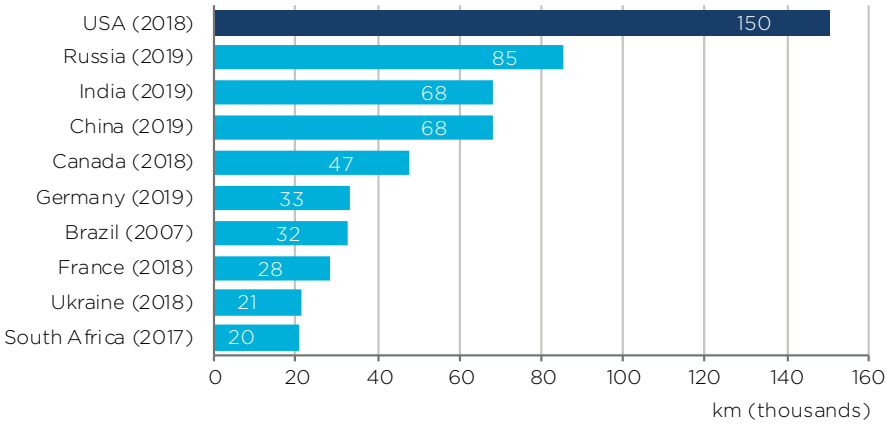
1. INTRODUCTION

With 150,000 route kilometers, the US freight rail network is the longest in the world (Fig. 2).[1] It is also the world's third busiest system, after only China and Russia, transporting 2.1 billion tonne-kilometers of goods in 2020, (Fig. 3). While the US passenger rail system is not particularly large by international standards (Fig. 4), the US freight rail network is widely considered the largest, safest, and most cost-efficient in the world.[2] Together, US freight and passenger rail[3] operations make up the rail transportation industry, which in 2020 employed approximately 177,000 direct employees and produced $74 billion in industry output (rail transportation services).[4]

The focus of the current report, however, is not the rail transportation industry itself, but the rail supply industry—the industry behind the rail transportation industry, which supplies the goods and services upon which US rail transportation depends. While the rail transportation industry is clearly delineated in government statistics,[5] the rail supply industry includes parts of the outputs of many different industries which are used by the rail transportation industry. Railway suppliers play an essential role in supporting the rail system by:

- **Producing the railroad rolling stock** that travels along the nation's rail tracks;
- **Making the tracks themselves**—manufacturing the metal rails and the wooden or concrete ties on which they are set, as well as the construction services involved in installing them;
- **Producing the signaling and communications infrastructure** that runs alongside the tracks; and
- **Making the myriad other goods and services** that are purchased by the rail transportation industry as operational and capital expenditures, and that keep the nation's rail transportation system running smoothly and safely.

Fig. 2: Top 10 national freight rail systems by route length, most recent available year



Source: World Bank, Oxford Economics

[1] This internationally comparable figure from the World Bank is lower than the estimate of 136,650 miles (220,000km) of tracks estimated by the American Association of Railroads (AAR "Freight Rail in Your State" https://www.aar.org/data-center/railroads-states/), likely due to definitional differences in the coverage of the two estimates.

[2] "Freight Rail Overview," Federal Railroad Administration, accessed December 15, 2022.

[3] This includes intra-urban rail systems, like subways and streetcars.

[4] Source: IMPLAN, based on government data.

[5] It is classified as North American Industrial Classification System (NAICS) code 482, under the transportation and warehousing sector. See https://www.census.gov/naics/.

In this report, commissioned by The Railway Supply Institute (RSI) as an update to our 2018 report on the same topic,[6] Oxford Economics calculates the full economic impact of the rail supply industry on national and state economies in terms of GDP, employment, and taxes revenues supported. The reference year throughout is 2020—the most recently available year of data when this work was undertaken. The full economic impact includes the sum of the activities taking place in the rail supply industry itself (the direct impact), the economic activity in the rail suppliers' supply chain (the indirect impact), and activity supported by the spending of workers out of wages (the induced impact).

As part of this work, Oxford Economics surveyed rail supply industry firms that are members of the industry's major associations:

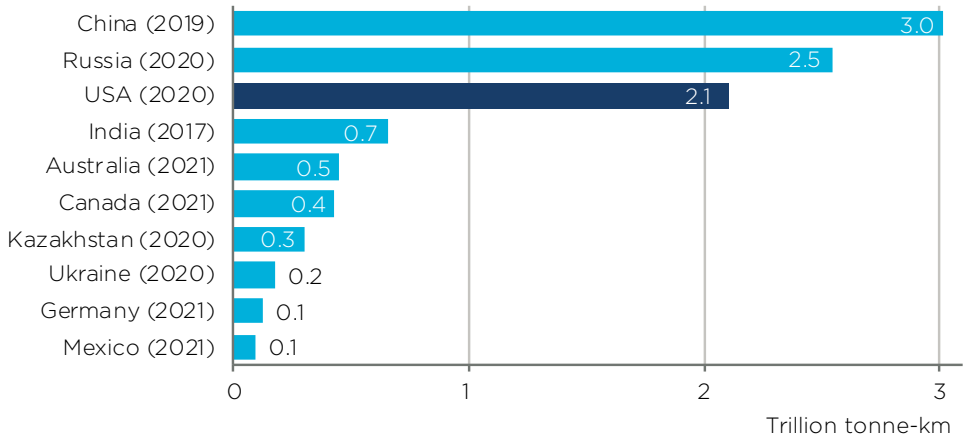
- RSI (Rail Supply Institute, which represents a variety of rail suppliers including rolling stock manufacturers and freight rail car lessors);
- REMSA (Railway Engineering-Maintenance Suppliers Association, which represents suppliers of maintenance of way equipment);
- RTA (Railway Tie Association, which represents the makers of the mostly wooden ties which support the metal rails of railroad tracks); and
- RSSI (Railway Systems Suppliers, Inc., which represents manufacturers of communications and signaling infrastructure),

The survey results were used to help break out the state-level economic impacts, and to validate the national industry results.

Chapter 2 of this report describes and defines the rail supply industry. This definition enables estimation of the industry's impact (chapter 3) in terms of jobs, GDP and taxes. Chapter 4 presents these results at a state level. Chapter 5 looks at recent trends in the rail and rail supply industries. Chapter 6 presents concluding thoughts. Appendix A provides a technical methodology, and appendix B presents detailed state-level impact tables.

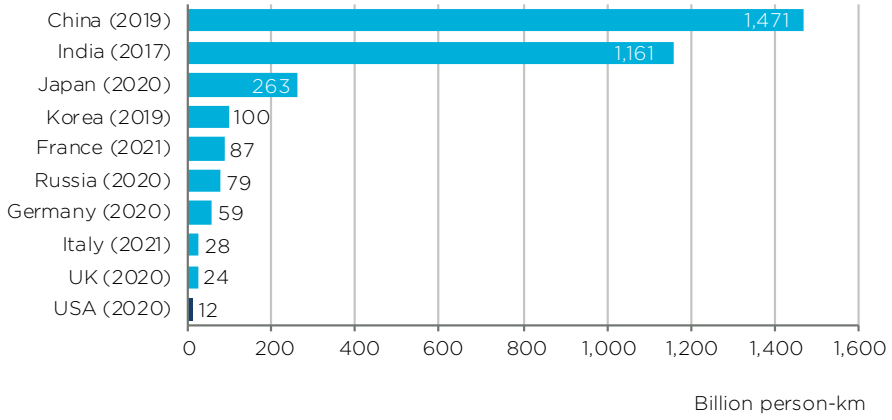
[6] Oxford Economics (October 2018). "Tracking the Power of Rail Supply: The Economic Impact of Railway Suppliers In the U.S." https://www.oxfordeconomics.com/resource/431fd99b-cd41-4f3c-8277-a2efc045d0bd/. Appendix A discusses the differences between results from the old report and those presented in this report.

Fig. 3: Top 10 national freight rail systems by weight-distance transported, most recent available years



Source: OECD, Oxford Economics

Fig. 4: Top nine national passenger rail systems and USA by passenger-distance transported, most recent available years



Source: OECD, Oxford Economics

2. OVERVIEW OF THE RAIL SUPPLY INDUSTRY

2.1 UNDERSTANDING THE INDUSTRY

The rail supply industry comprises the output of goods and services used by the rail transportation industry. There is no formal definition of which sectors constitute the rail supply industry. According to the Railway Supply Institute (RSI), the rail supply industry broadly includes rolling stock manufacturers, railcar lessors, and railroad operations (maintenance and communications & signaling), and manufacturers of rail parts. Other sources, such as International Rail Organization UNIFE, provide similar segmentation.

Rolling stock is an umbrella term that denotes anything on rail wheels that can move on a railway. This includes locomotives, rail cars, and all other vehicles with steel wheels that can be used on railroad tracks. Rolling stock manufacturers produce locomotives and different types of railcars, such as box cars, hoppers, gondolas, flat cars, and tank cars. Rolling stock suppliers make parts used by rolling stock manufacturers, such as brakes, lighting, and seats needed to build railcars and locomotives.

Other specialty rail supply industries include railroad maintenance, and communications & signaling. Railroad maintenance involves checking railroad tracks for missing or damaged ties, damaged rails, and obstructions such as fallen trees and disabled trains. These procedures are performed with the use of specialized equipment such as hi-rail vehicles, electronic detection equipment, and handheld devices. The communications & signaling sector builds railroad crossing systems and other systems that direct railway traffic.

Manufacturers of rail parts produce pieces necessary for building railroad tracks. Important components of railroad tracks are rail crossties, joint bars, and fasteners. Rail crossties are rectangular wooden pieces that are located between two rail tracks. Their primary purpose is to keep the correct distance of the gauge. Joint bars are metal bars that join two rails together. Fasteners connect rails and base plates with rail ties and rail crossties.

2.2 DEFINING THE RAIL SUPPLY INDUSTRY FOR THE ECONOMIC IMPACT MODELING

For the purpose of the economic impact modeling in this report, the results of which are presented in chapters 3 and 4, we define the rail supply industry to comprise the sum of three categories of economic activity, with care taken to avoid double-counting the overlap between them:

- The railroad rolling stock manufacturing industry (subsection 2.2.1);
- The capital expenditures of the rail transportation industry (subsection 2.2.2); and
- The operational expenditures of the rail transportation industry (subsection 2.2.3).

These three segments of the rail supply industry, which are inclusive of the specialty rail supply segments described in section 2.1 above, are described in the following three subsections. Subsection 2.2.4 consolidates the total output of the rail supply industry across the three segments.

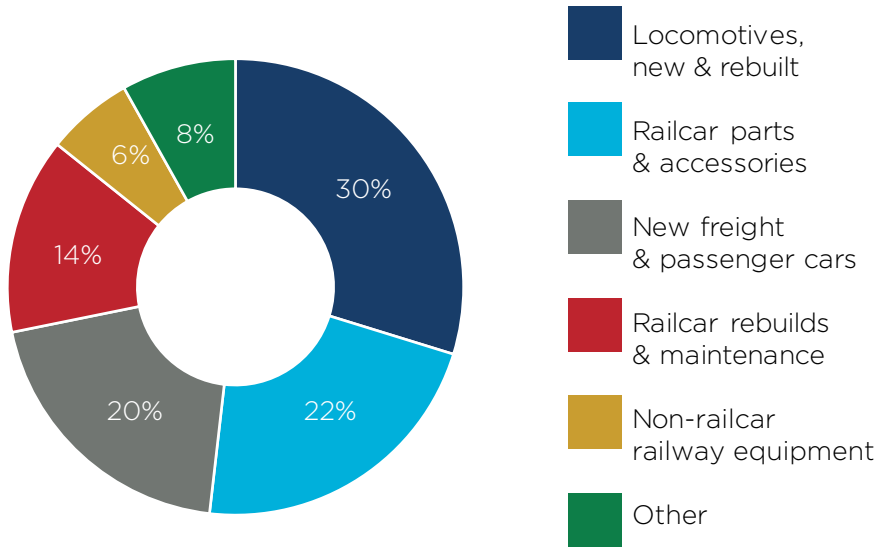
2.2.1 Railroad rolling stock manufacturing

Unlike the other two segments of the rail supply industry discussed below, the railroad rolling stock manufacturing industry is a standard industry classification in government statistics.[7] The industry definition includes:

- Manufacture of vehicles that travel on rails, including:
  - Locomotives,
  - Freight railcars
  - Passenger railcars, including inter-city and urban transport cars
  - Other specialty rail vehicles, such as mining cars and track maintenance-of-way equipment
- Manufacture of rolling stock-specific parts, such as wheels and brakes[8]
- Major rebuilds of railcars.

Data from the Annual Survey of Manufacturers (ASM) shed light on the composition of the rolling stock industry's output in 2020. As shown in Fig. 5, the largest share of the industry's output was new and rebuilt locomotives (30%), while parts and accessories made up 22% of industry output, and new freight and passenger cars 20%.

Fig. 5: Output of the railroad rolling stock industry, 2020



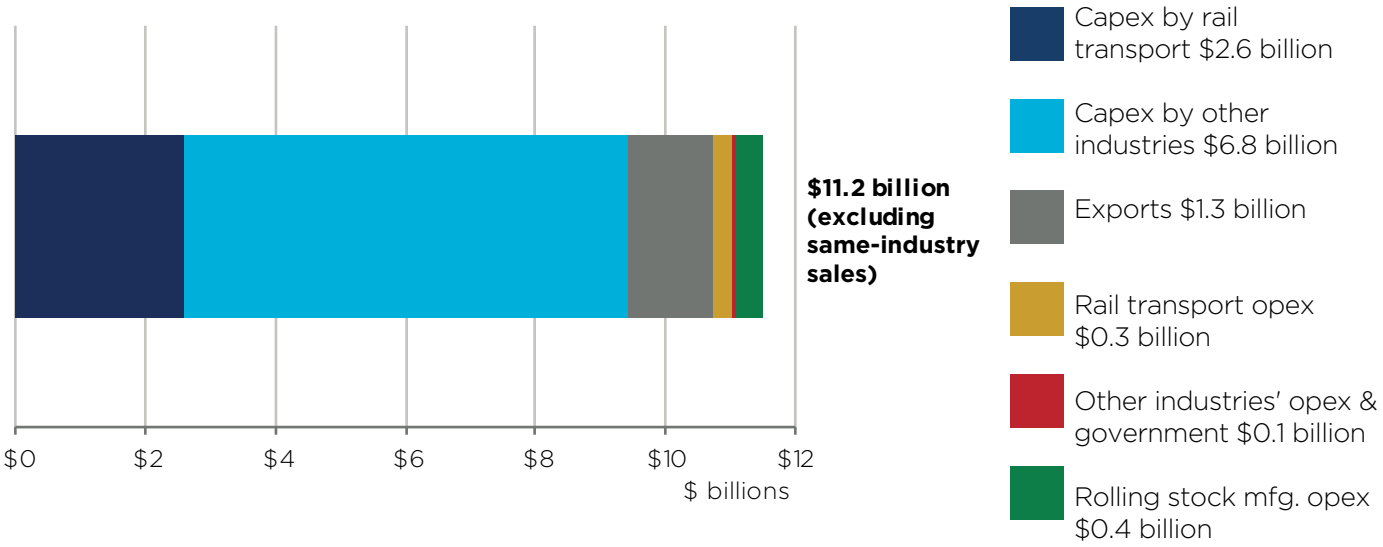
Source: ASM, Oxford Economics

[7] It is classified as NAICS 3365

[8] General parts used in rolling stock manufacturing as well as other industries, such as sheet metal or ball bearings, would be classified under the relevant industries that produce them. Only the manufacture of parts specific to railroad rolling stock are classified under the rolling stock industry.

Fig. 6 presents the end uses of the $11.5 billion of railroad rolling stock output purchased in 2020. This constitutes the rolling stock inputs to the economic impact modeling presented in chapter 3. The bulk of rolling stock output, $9.4 billion or 82%, was purchased by various industries as capital expenditures. Of this, we estimate that only about $2.6 billion was purchased by the rail transportation industry itself.[9] In fact, much of the rolling stock that is transported by the US rail transportation industry is not owned by rail transportation industry itself. Some of the additional equipment is owned by the industries whose goods are being transported—an oil or chemical producer, for example, might own some of its own tank railcars. The largest share of railcars, however, is owned by railcar lessors, who lease their vehicles to shippers of finished goods and raw materials, charging rental fees for this service. This structure simplifies the accounting when a railcar is transferred between the networks of the major rail carriers and contributes to the high efficiency of the US freight rail network.

Fig. 6: End uses of railroad rolling stock, 2020



Source: IMPLAN, Oxford Economics

[9] This estimate is based on data on the capital expenditures of the rail transportation industry, which are presented in subsection 2.2.2 below. Government data provide little detail on the detailed makeup of industries' capital expenditures, making it difficult to quantitatively profile which industries purchase railroad rolling stock, although as the text makes clear, a major purchaser is the commercial and industrial machinery and equipment rental and leasing industry, NAICS 5324.

1.6m railcars

Two-thirds of these are owned by leasing companies.

Full-service lessors are responsible for the maintenance and repairs of freight railcars along with the modifications necessary to meet government and industry safety requirements

There are approximately 1.6 million railcars in the US. Approximately two-thirds of these are owned by leasing companies, while the remaining one-third are owned by railroads or private shippers. **The leasing market for railcars has been increasing over time. Full-service lessors are responsible for the maintenance and repairs of freight railcars along with the modifications necessary to meet government and industry safety requirements**.

After capital investment, the largest share of the remainder of rolling stock sales, $1.3 billion or 11%, is sold as foreign exports.[10] The final $0.8 billion of 2020 rolling stock to other industries as intermediate inputs, which is to say as those industries' operational rather than capital expenditures.[11] Of this, most was sold either to the rail transportation industry ($0.3 billion) or to the railroad rolling stock manufacturing industry itself ($0.4 billion). Note that this final share, sold by firms in the railroad rolling stock industry to other firms in the same industry, needs to be discounted in the economic impact calculations to avoid double-counting.[12]

[10] These exports are included in the definition of, and therefore the economic impact of, the rail supply industry presented in this report. Note, however, that other US exports besides rolling stock that are purchased for use by foreign rail systems—track signaling equipment, for example—are not captured, because they cannot be similarly identified in government statistics.

[11] A small amount, $33 million, was sold to government as a final use rather than as an intermediate input to further production.

[12] More precisely, the economic impacts of the railroad rolling stock industry are calculated as an "economic contribution" rather than an "economic impact," because they constitute 100% of the industry, so subsequent purchases of the same industry's output would double-count this output. Appendix A provides additional details on the distinction between economic impact and economic contribution.

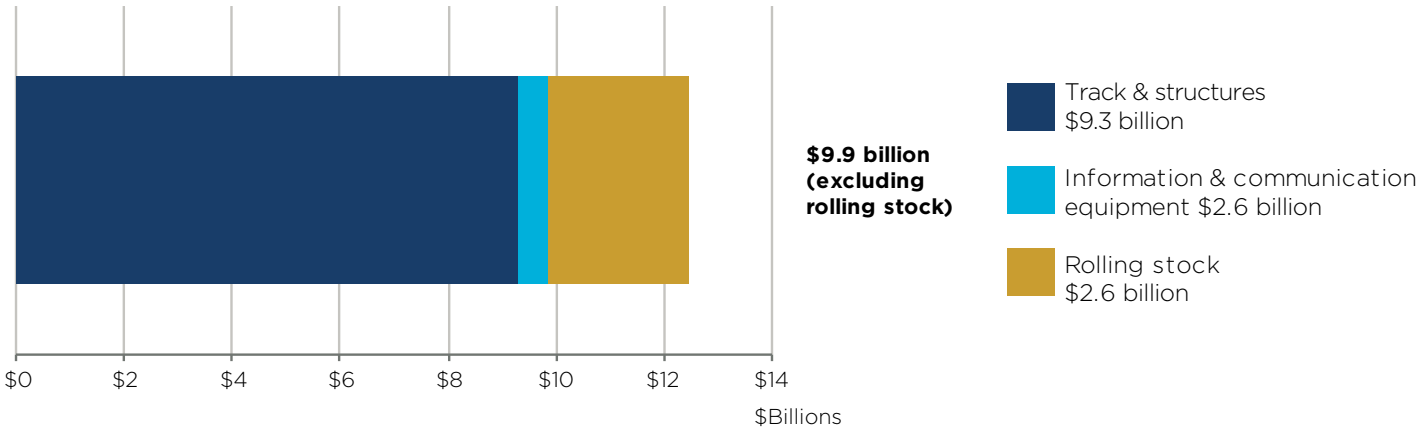
2.2.2 Capital expenditures of the rail transportation industry

Rail transportation is a highly capital-intensive industry. The rail network, as well as the rolling stock fleet, require continuous investment to maintain and upgrade capacity, and to keep the system operating safely and efficiently.

According to the Annual Capital Expenditures Survey (ACES),[13] in 2020, the rail transportation industry made $12.5 billion in capital investments in new (as opposed to used) structures and equipment.[14] This is equivalent to approximately 17 cents out of each revenue dollar that year.[15]

Of this, $9.3 billion was spent on structures, mostly investments in track infrastructure. The remaining $3.1 billion[16] was spent on equipment, of which we estimate that $2.6 billion was spent on railroad rolling stock (matching the total presented in Fig. 6 above), and $0.5 billion on information and communications equipment.[17] Because the investment in railroad rolling stock is already accounted for under rolling stock in section 2.2.1 above, it is excluded here, leaving $9.9 billion of additional rail transportation industry capital expenditures as inputs to the economic impact modeling (Fig. 7).

Fig. 7: Rail transportation capital expenditures, 2020



Source: ACES (Census), BEA Investment in Fixed Assets, Oxford Economics

[13] Generally, capital expenditures reflect investments in fixed assets whose lifespan exceeds one year, excluding consumer durables. For the ACES survey, the Census Bureau defines capital expenditures to "include all expenditures during the year for both new and used structures (excluding land) and equipment chargeable to asset accounts for which depreciation amortization accounts are ordinarily maintained." (https://www.census.gov/programs-surveys/aces/about/faq.html.) Note that we exclude capital expenditures on used structures and equipment as these do not generate an economic impact in terms of jobs and GDP in the reference year.

[14] The American Association of Railroads (AAR) has estimated that, between 1980 and 2021, freight railroads spent nearly $760 billion on railroad capital investments. This estimate incorporates data from the financial statements of publicly traded railroads. See https://www.aar.org/issue/freight-rail-investments. Similar to our other data inputs, which are sourced, through IMPLAN, from government statistical surveys; in this study, we use data from the ACES, as described in the text.

[15] Based on industry revenue of approximately $74 billion, (source: IMPLAN).

[16] Totals do not add due to independent rounding.

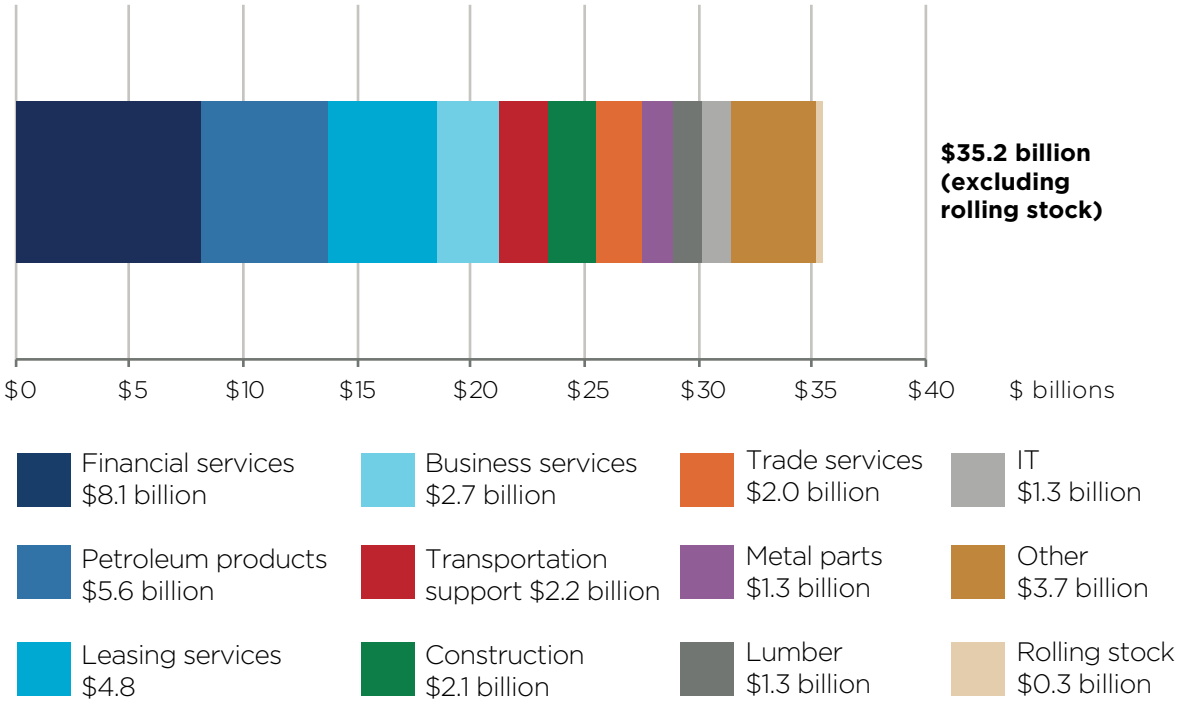
[17] The structures vs. equipment breakout is given in the ACES, while the breakout between rolling stock and information and communications equipment is based on data in the Bureau of Economic Analysis' (BEA) Investment in Fixed Assets. See Appendix A for additional details.

2.2.3 Operational expenditure of the rail transportation industry

When it comes to day-to-day operational spending by the rail transportation industry, the bulk of the $35.5 billion of expenditure in 2020 came from service industries to keep the network running (Fig. 8).[18] This included $8.1 billion on financial services, $2.7 billion on business services (e.g. accounting, legal, etc.), and $2.2 billion on transportation support services. A total of $4.8 billion was spent on leasing services, reflecting the key role of railcar lessors to the industry, discussed in section 2.2.1. Other spending on key rail supply industry sectors include $1.3 billion spent on lumber, the bulk of which was used for railroad ties, and $0.3 billion on railroad rolling stock (likely parts). Note that, as operational expenditures, these likely reflect maintenance costs associated with tracks and railcars, rather than capital investments on major track work or new railcar purchases.

As with capital expenditures in section 2.2.2, for the purposes of defining the rail supply industry, we exclude the $0.3 billion of operational expenditures spent on railroad rolling stock purchases to avoid double-counting with the railroad rolling stock spending presented in 2.2.1. This leaves $35.2 billion of operational expenditures that contribute to our definition of the rail supply industry for the economic impact modeling.[19]

Fig. 8: Operational expenditure of the rail transportation industry, 2020



Source: : IMPLAN, Oxford Economics

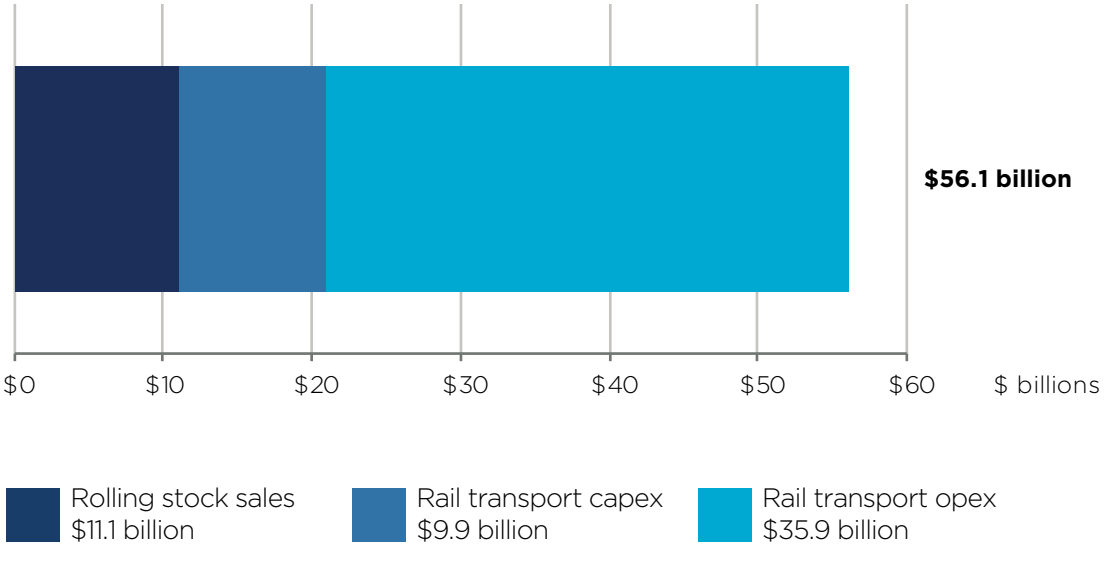
[18] The BEA defines operational expenditures, under the title of "intermediate inputs," as "goods and services that are used in the production process of other goods and services and are not sold in final-demand markets." (https://www.bea.gov/help/glossary/intermediate-inputs.)

[19] Source: IMPLAN, based on government data.

2.2.4 Rail supply industry total

The total spending by the rail transportation industry and others,[20] which constitutes the definition of the rail supply industry purchases used in the economic impact modeling, totaled $56.1 billion in 2020 (Fig. 9). This comprises $11.1 billion in rolling stock purchases, $9.9 billion in rail transport capital expenditures, and $35.2 billion in operational expenditures, after removing any double counting. This spending constitutes the inputs to the economic impact modeling of the rail supply industry, the results of which are presented in chapters 3 and 4.

Fig. 9: Total rail supply industry economic modeling inputs, excluding double-counting, 2020



Source: Oxford Economics

[20] As described in section 2.2.1, spending by entities other than the rail transportation industry on railroad rolling stock is included in our industry definition. This includes purchases by other industries, including the railcar leasing industry, government purchases, and foreign exports.

3. NATIONAL ECONOMIC IMPACTS

This chapter presents the economic impacts of the rail supply industry, including the direct (the activity of the industry itself), indirect (supply chain activity), and induced (economic activity supported by the spending of direct and indirect employees out of wages) impacts. The box on the following page provides an overview of economic impact methodology. Appendix A provides additional technical detail about the rail supply industry economic impact methodology.

3.1 GDP IMPACT

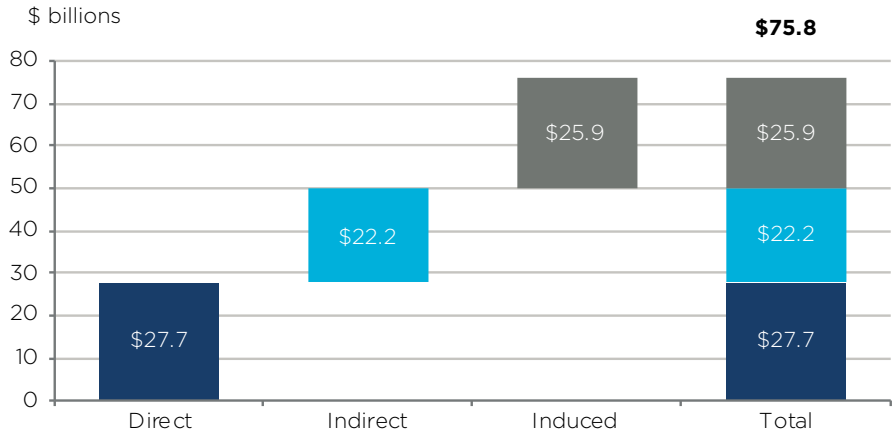
Combining all channels of impact—direct, indirect (supply chain), and induced (wage spending)—the rail supply industry contributed $75.8 billion to US GDP in 2020, equivalent to about 0.4% of the total US GDP. For comparison if the railway supply industry were represented as a US state, the industry would rank as the 44th largest state ahead of Rhode Island and just behind Maine.

The direct GDP impact of the rail supply industry was $27.7 billion, or 36.5% of the total GDP impact. This number represents the value-added economic activity of the rail supply establishments themselves. Another way to describe the direct GDP contribution is the difference between the total output (or revenue) of the rail supply industry and the total value of the intermediate goods and services used in production.

The indirect GDP impact of the rail supply industry was $22.2 billion, or 29.3% of the total GDP impact. This number represents the value-added economic activity of the supply chain of the rail supply industry. The supply chain of the rail supply industry consists of producers of sheet plates, nuts, bolts, etc.

The induced GDP impact of the rail supply industry was $25.9 billion, or 34.2% of the total GDP impact. This number represents the value-added economic activity supported by the spending of workers employed directly by the rail supply industry or its supply chain.

Fig. 10: GDP impact of the rail supply industry, 2020



Source: Oxford Economics, IMPLAN

AN INTRODUCTION TO OUR ECONOMIC IMPACT ANALYSIS

The input-output model follows the flow of spending through the economy. The model captures and quantifies the impact of the economic activity of the rail supply industry on supply chains, consumer spending, economic leakages, and taxes paid to federal, state and local governments.

The economic impacts of the rail supply industry are measured through three channels:

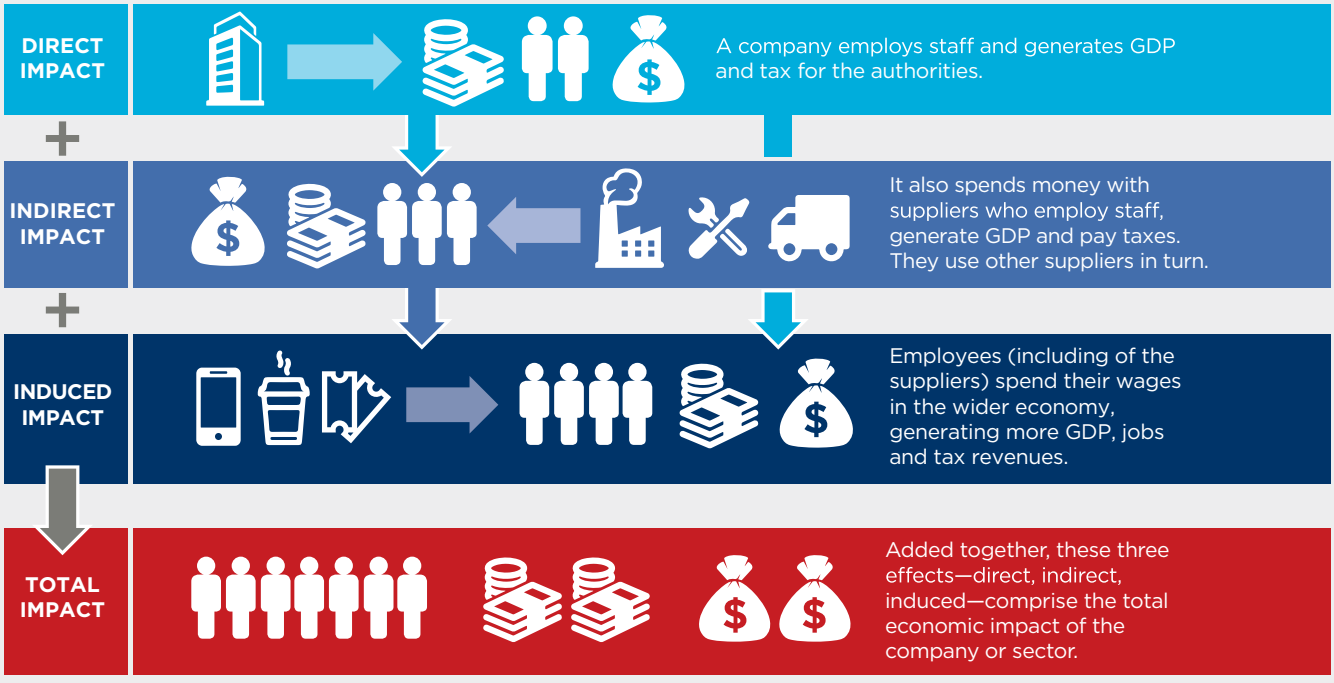
- **Direct Impact:** Economic activity in the rail supply industry itself.
- **Indirect Impact:** Economic activity in the full supply chain of the rail supply industry.
- **Induced Impact:** Economic activity resulting from direct and indirect workers spending their wages in the broader economy.
- **Total Impact:** the sum of direct impact, indirect impact, and induced impact.

The model captures the inter-industry relationships, consumer spending, and ripple effects that result from the economic activity of the rail supply industry.

The economic impact is measured in terms of:

- **GDP:** Value-added economic activity.
- **Employment:** Total jobs, measured on a headcount basis, including both wage and salary workers and the self-employed.
- **Labor** income: Total compensation (including the cost benefits) for these workers.
- **Taxes:** Total taxes generated by the direct, indirect, and induced economic activity.

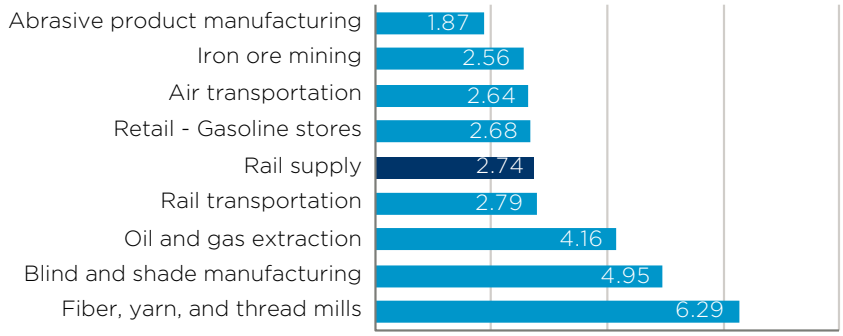
Fig. 11: Channels of impact



Source: Oxford Economics

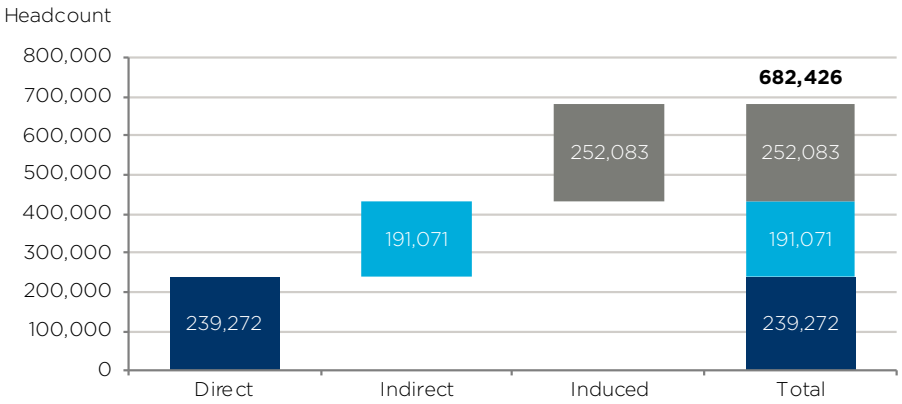
The GDP multiplier for the rail supply industry in 2020 is 2.7[21]. This means that every $100 of value-added output in the rail supply industry leads to an additional $170 of value-added output in other industries due to the production in the supply chain and employee spending impact. This multiplier is similar to that of rail transportation, retail gasoline stores, and air transportation industries.

Fig. 12: GDP multiplier in the rail supply industry compared to other industries, 2020



Source: : Oxford Economics, IMPLAN

Fig. 13: Employment impact of the rail supply industry, 2020



Source: : Oxford Economics, IMPLAN

[21] The GDP multiplier measures how the change in GDP in one industry translates into the change in GDP in the economy as a whole. The GDP multiplier is calculated as the ratio of total GDP impact ($75.8 billion) to direct GDP impact ($27.7 billion).

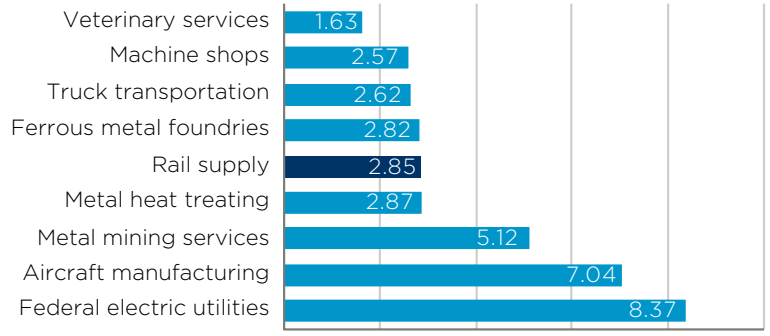
3.2 EMPLOYMENT IMPACT

The total employment impact of the rail supply industry in 2020 was 682,426 jobs. This includes 239,272 jobs in the rail supply industry itself (direct contribution), 191,071 jobs in the supply chain of the rail supply industry (indirect contribution), and 252,082 jobs created as a result of employees from the rail supply industry and its supply chain spending their wages in the economy (induced contribution). Fig. 13 summarizes these contributions. The large, induced employment contribution is in part a result of the high average compensation in the rail supply industry (see Fig. 17).

The rail supply industry has a jobs multiplier of 2.9[22]. This means that every job in the rail supply industry supports 1.9 jobs in other industries. This puts it ahead of other US industries such as machine shops, truck transportation, and ferrous metal foundries.

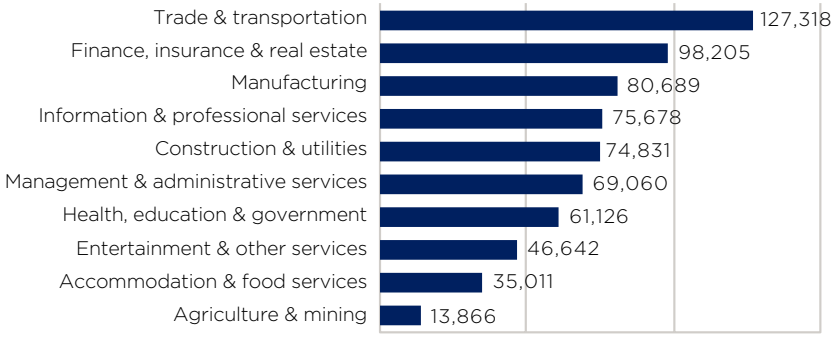
Looking at the breakout of the total employment impact by industry sector, the greatest impact of the rail supply industry on employment is in trade & transportation industry (19% of all jobs), followed by finance, insurance & real estate (14% of all jobs), and manufacturing (12% of all jobs).

Fig. 14: Jobs multiplier in the rail supply industry compared to other industries, 2020



Source: Oxford Economics, IMPLAN

Fig. 15: Total rail supply employment impact by industry, 2020



Source: Oxford Economics, IMPLAN

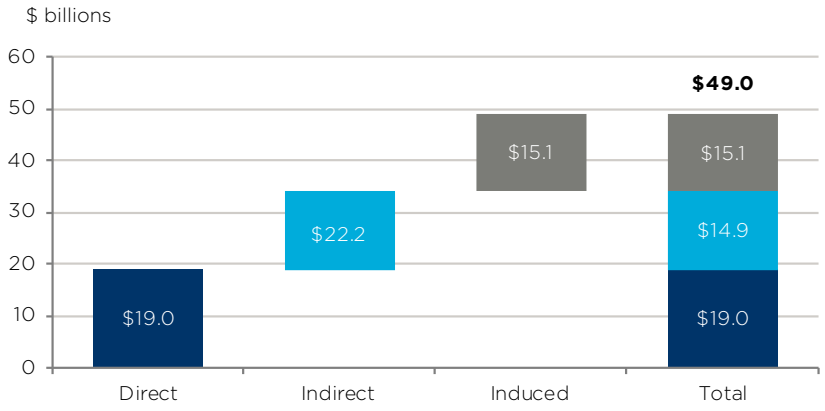
[22] The jobs multiplier shows how the creation or destruction of employment in one industry translates into a change in employment in the economy. The jobs multiplier is calculated as the ratio of total jobs supported to direct jobs.

3.3 LABOR INCOME IMPACT

The total labor income contribution of the rail supply industry in 2020 was $49.0 billion. This represents the total compensation (including both wages and salaries as well as other forms of compensation like health and retirement benefits) received by workers in each of the three channels of impacts, including by self-employed workers.
The direct (in the rail supply industry itself) 2020 labor income impact was $19.0 billion. The indirect (supply chain) labor income impact was $22.2 billion. The induced labor income impact was $15.1 billion (Fig. 16).

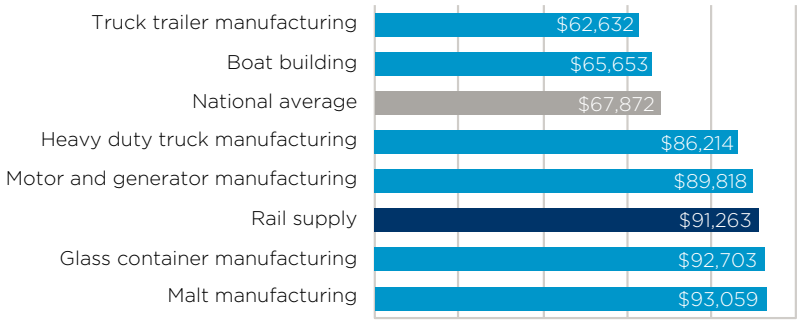
The average compensation of direct employees in the rail supply industry itself in 2020 was $91,263 per year, which is 34% higher than the national average across all industries ($67,872). As with the labor income figures presented above, this value represents total compensation, including the value of benefits such as health and retirement programs; however, it only includes direct employees, and excludes self-employed workers in all the industries presented.

Fig. 16: Labor income impact of the rail supply industry, 2020



Source: : Oxford Economics, IMPLAN

Fig. 17: Average employee compensation by select industries, 2020

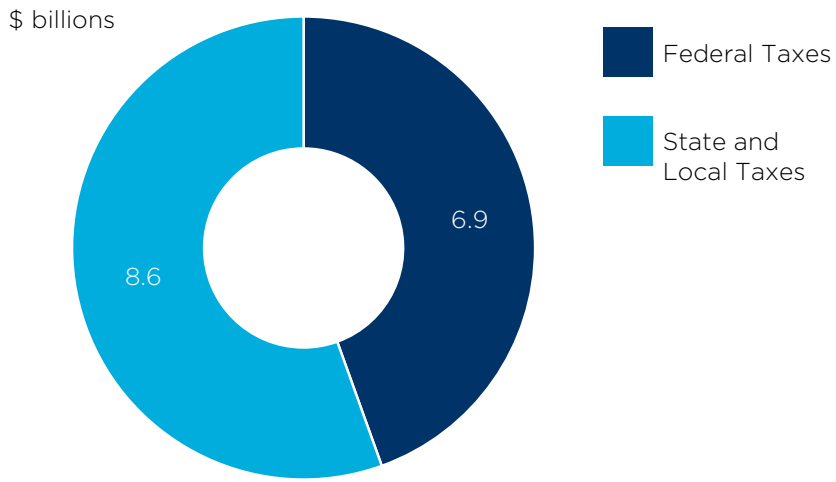


Source: : Oxford Economics, IMPLAN

3.4 TAX CONTRIBUTION

The direct, indirect, and induced economic activity supported by the rail supply industry generated over $15.5 billion in taxes at all levels of government in 2020. This number can be further divided into $6.9 billion paid in federal taxes and $8.6 billion paid in state and local taxes. This is equivalent to about $22,720 in tax revenue for each of the 682,426 jobs supported by the economic activity of the rail supply industry.

Fig. 18: Tax contribution of the rail supply industry, 2020

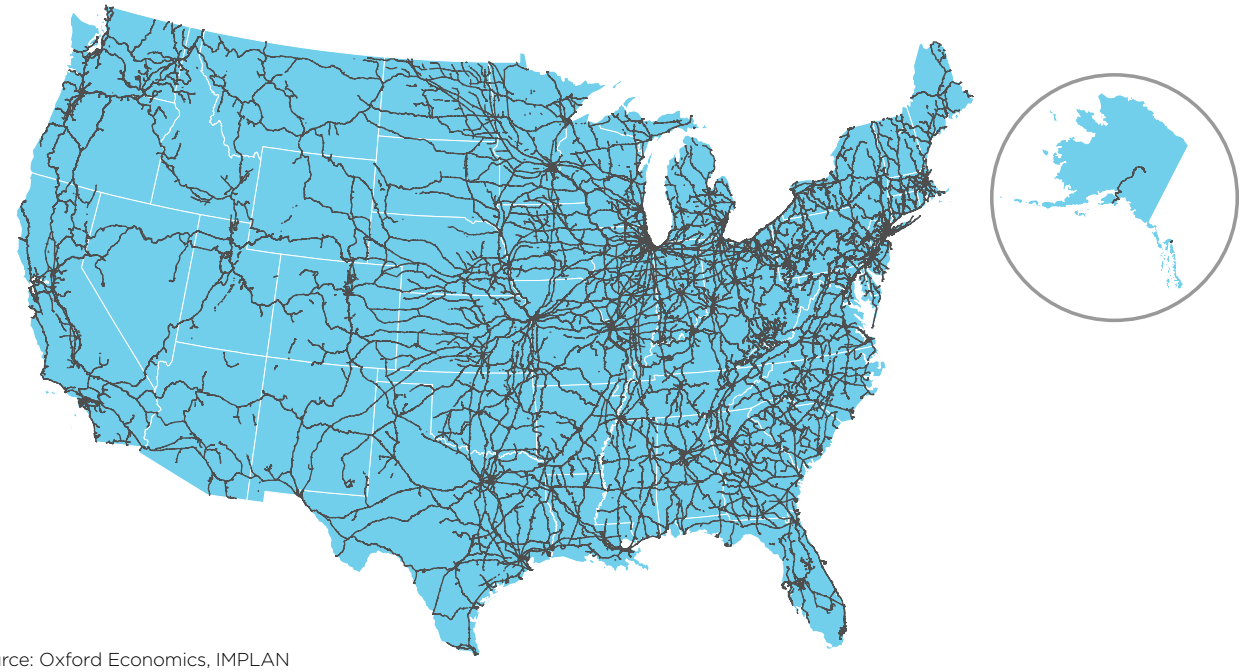


Source: Oxford Economics, IMPLAN

4. STATE-LEVEL ECONOMIC IMPACTS

The previous section showcases the nationwide contribution of the rail supply industry to GDP and employment. Even though rail suppliers operate in all 50 states, the impacts are distributed differently across states. Fig. 19 presents a map of the US rail network, showing that the concentration of rail lines is not evenly distributed through the country, and instead is concentrated in the Midwest and Great Plains states down to Louisiana and Texas, as well as in the Southeast. This distribution of the rail network helps provide context for the state-level rail supply impacts presented in this chapter, although other factors (such as the concentration of major rail supplying industries) also affect this distribution.

Fig. 19: US rail network map, 2021[23]



Source: Oxford Economics, IMPLAN

[23] Source: TigerLine File for US Rail 2021 (https://www2.census.gov/geo/tiger/TIGER2021/RAILS/).

Oxford Economics conducted an original survey of RSI, REMSA, RTA, and RSSI members to help estimate the impact of the rail supply industry by state.

Regionally, railway suppliers had the largest presence in the Midwest region, followed by the Southwest region and the Middle Atlantic region. The top five states (Texas, California, Illinois, Pennsylvania, and New York) in terms of GDP contribution (Fig. 21) accounted for 40% of rail supply impact nationwide. In terms of employment impacts (Fig. 22), these same top five states accounted for 36% of the national impacts:

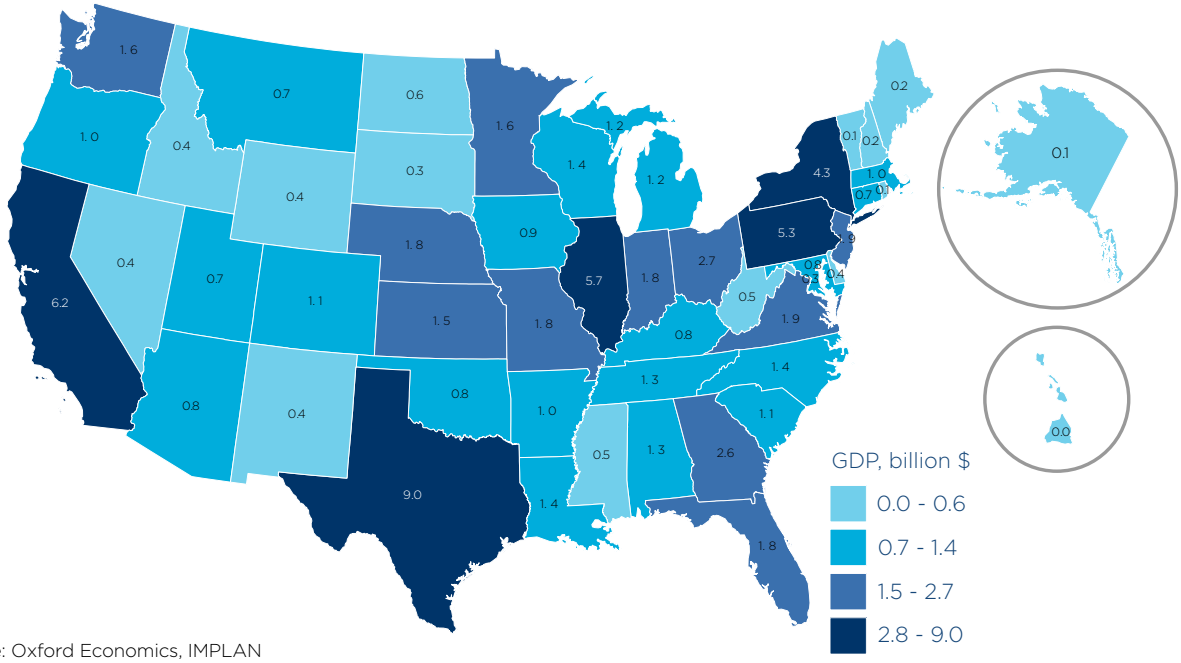
- **Texas** benefitted most as rail suppliers contributed $9.0 billion in GDP and 77,536 in jobs;
- **California** was second with $6.2 of total GDP contribution and 45,104 jobs;
- **Illinois** was third with $5.7 billion of total GDP contribution and 46,908 jobs;
- **Pennsylvania** followed with $5.3 billion of total GDP contribution and 46,044 jobs; and
- **New York** was fifth with $4.3 billion of GDP contribution and 27,684 jobs.

Fig. 20: Economic impacts in top five states, 2020

State	GDP contribution	Jobs supported
Texas	**$9.0 billion**	**77,536**
California	**$6.2 billion**	**45,104**
Illinois	**$5.7 billion**	**46,908**
Pennsylvania	**$5.3 billion**	**46,044**
New York	**$4.3 billion**	**27,684**

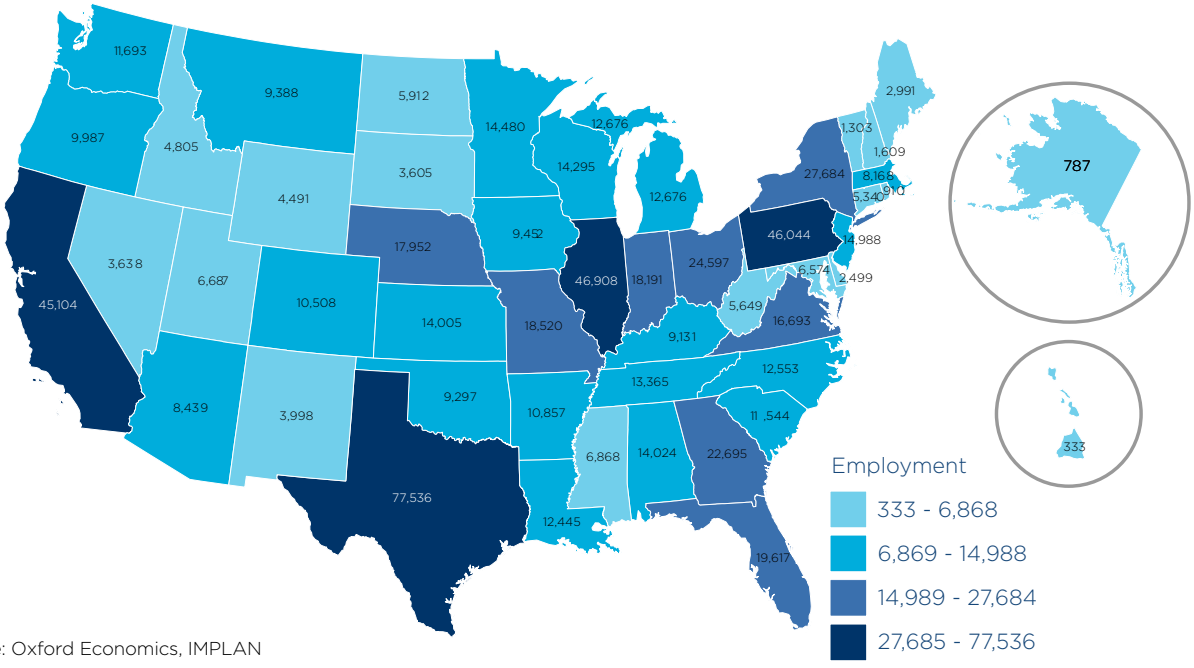
Source: : IMPLAN, Oxford Economics

Fig. 21: Total GDP impact by state, 2020



Source: Oxford Economics, IMPLAN

Fig. 22: Total employment impact by state, 2020



Source: Oxford Economics, IMPLAN

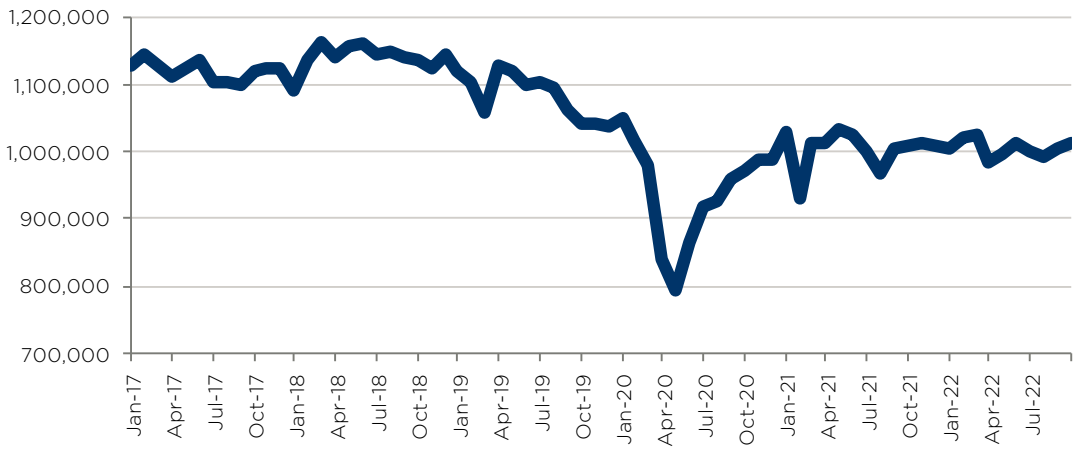
5. IMPACT OF COVID-19 ON OUTLOOK

The economic impacts presented in chapters 3 and 4 are all benchmarked to 2020—the most recently available data when this report was undertaken. This was also, however, an unusual year, both for the US economy as a whole as well as for the rail transportation industry in particular, due to the Covid-19 pandemic. Activity in the freight rail transportation industry is largely dependent on demand in major commodity industries that are most dependent on freight rail services, such as coal, cereal grains, basic chemicals, and gravel.[24] Sector activity also broadly reflects trends in the US economy.

Fig. 23 shows the effects that the Covid-19 pandemic had on activity in the freight rail transportation industry, with monthly carloads falling from 1.1 million as recently as summer 2019 to 800,000 at the peak of the pandemic, before recovering to about 1.0 million by the end of 2020—a level it has remained at through September 2022.

Activity in the rail supply industry is largely driven by activity in the rail transportation industry, among other key factors. Demand for rail equipment is, therefore, closely related to the demand for freight shipment. The volume of rail freight exhibited strong growth in 2017-2018, averaging about 4.5% per year. It decreased during the pandemic in 2019-2020 but picked up again in 2021. A moderate growth averaging under 2% per year is expected for the next few years.[25] As Fig. 23 shows, after a dip in both rail transportation industry output and its operating expenditure during the Covid-19 pandemic in 2020 both measures showed a rebound in 2021 by 11.2% and 11.8% respectively.

Fig. 23: Monthly rail freight carloads, seasonally adjusted[26]



Source: Federal Reserve Economic Data

[24] See, for example, US DOT FWA Freight Management and Operations: Rail – Commodities Moved." https://ops.fhwa.dot.gov/publications/fhwahop16083/ch1.htm#ch1.8.

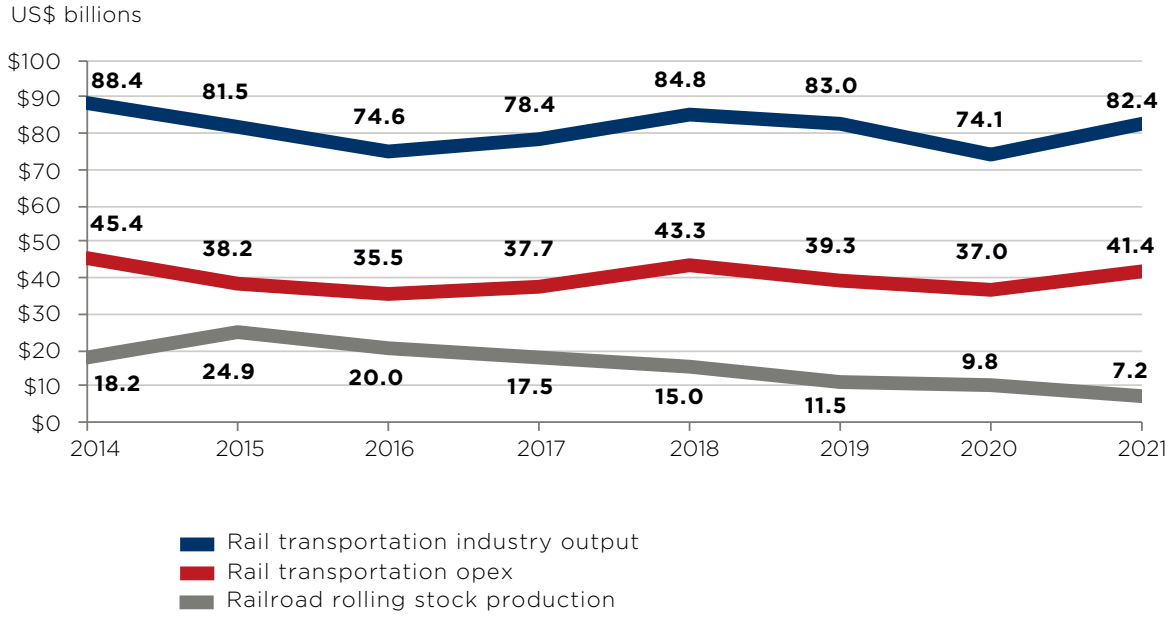
[25] Forecast by FTR Transportation Intelligence ("Rail Equipment Outlook: North American Railcar Markets 2022 - Q2").

[26] Downloaded from FRED (https://fred.stlouisfed.org/). Variable RAILFRTCARLOADSD11.

While high selling prices and slow freight growth may lead to a slowdown of demand for rail equipment in the next few years, demand in the first half of 2022 was strong. Despite a moderate near-term outlook, the rail supply industry remains a key player in the US economy.

However, investments in capital expenditures, including the purchase of railroad rolling stock (the majority of which is purchased as capital investment—see Fig. 6), can also be lumpy, and lag industry activity. This may help explain why railroad rolling stock production continued to fall from 2020 to 2021, from $9.8 billion to $7.2 billion, even as the overall output of the rail transportation sector rose from $74 to $82 billion (Fig. 24). The decline in railroad rolling stock output continues a longstanding trend going back to 2015. Remarkably, railroad rolling stock industry output, a key component of the rail supply industry, has declined 71% from its high of nearly $25 billion of output in 2015 to $7.2 billion in 2021.

Fig. 24: Trends in rail transportation output and opex and rolling stock output, 2014-2021[27]



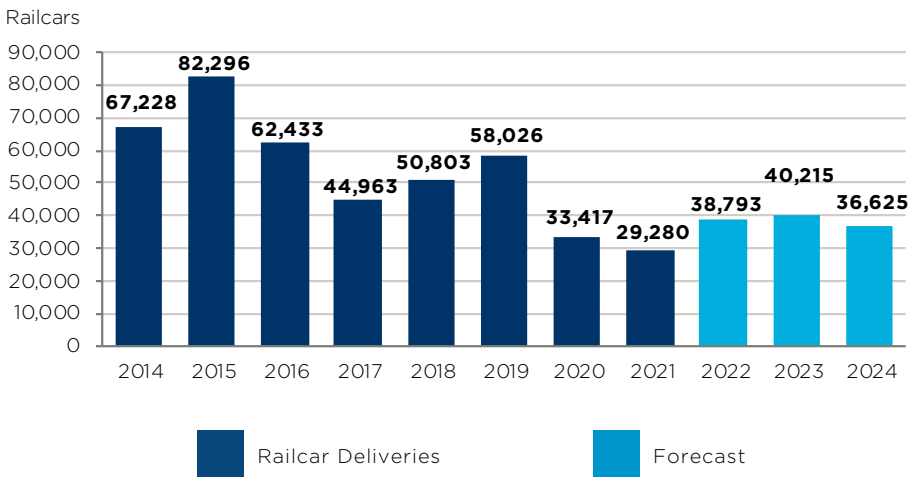
Source: IMPLAN, Oxford Economics

[27] Note that the "total rail supply spend" here sums the three components of spend discussed in chapter 2, but does not go through the de-duplicating procedures used there. Note too that what is shown here for railroad rolling stock is industry annual production, whereas Fig. 6 shows annual railroad rolling stock sales in 2020. The difference is largely accounted for by sales out of inventory.

With the rebound in the rail transportation industry in 2021, demand for railroad rolling stock, along with the other segments of the rail supply industry, is expected to pick up over the next few years. Generally, demand for new railroad rolling stock can be calculated as the sum of replacement units needed plus estimated new units. Demand for new units is derived from demand for freight. Demand for replacement rolling stock can be estimated using the life expectancy and average age of existing rolling stock. On average, life expectancy for railroad rolling stock is 40 to 60 years. In 2020, the average age of freight rail cars was 19.6 years, and the average age of locomotives was 28.1 years.[28] For freight rail cars, FTR Transportation Intelligence estimates a replacement rate of about 2% in the next few years. For locomotives, a replacement rate is expected to be higher due to the age of the existing fleet.

FTR Transportation Intelligence forecasts North American railcar deliveries to increase from a low of just under 30,000 in 2021 to just over 40,000 in 2023.

Fig. 25: North American railcar deliveries outlook, 2007-2024



Source: FTR Transportation Intelligence

[28] Railway Age (April 11, 2022) "Heavyweights Dominate." https://www.railwayage.com/news/heavyweights-dominate/. Cites Railinc, a subsidiary of AAR.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6. CONCLUSION

The rail supply industry serves a critical role in the efficient operation of the rail transportation sector by producing rail equipment and infrastructure and providing maintenance and repair services. Freight rail is one of the major industries in the US economy as it transports more long-distance freight than any other mode of transportation. However, consistent investment in maintaining rail infrastructure and updating the fleet is needed to ensure that rail transport can meet demands for freight transportation in the next decade of economic growth.

In addition to enabling functioning of the rail transportation industry, the rail supply industry made its own impact on national and state economies in 2020. For this report, the rail supply industry was defined as the sum of three categories of economic activity: the railroad rolling stock manufacturing industry, the capital expenditures of the rail transportation industry, and the operational expenditures of the rail transportation industry.

While the direct contribution by the rail supply industry in 2020 is hugely significant, with a GDP contribution of $27.7 billion in output and employing almost 240,000 workers, its impact on the US economy goes much further than that. Combining all channels of impact—direct, indirect (supply chain), and induced (wage spending)—the rail supply industry contributed $75.8 billion to US GDP in 2020. It supported more than 680,000 workers in a range of sectors and locations across the US. These workers employed in the industry are paid 34% more than the average across a range of industries. This economic activity generated $15.5 billion in federal, state, and local taxes.

While the rail supply industry operates in all 50 states, 40% of its economic activity was concentrated in five states: Texas, California, Illinois, Pennsylvania, and New York.

As the US economy recovers from the impact of Covid-19, the rail transportation industry is set for a rebound that will fuel demand for railroad rolling stock and other rail supply products and services that will continue to deliver both economic and social benefits across the country.


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APPENDIX A: METHODOLOGY

The inputs to the economic impact modeling are summarized in chapter 2. The principles behind the economic impact calculations are summarized in Fig. 10 on page 22.

Impacts were calculated using IMPLAN economic impact software.[29] IMPLAN is an industry-standard tool that collates government economic data from a variety of sources and streamlines economic impact calculations across different geographies.

The national results presented in chapter 2 are based on an IMPLAN model built on the inputs presented in Fig. 9. Both the rail transportation opex and capex spending were modeled as commodity purchase events. The railroad rolling stock impact was modeled as a contribution event, which suppresses any additional supply chain purchases of railroad rolling stock either in the supply chain of rolling stock production, or in the opex or capex spending.

The precise makeup of the rail transportation industry's opex spending by commodity type (which is summarized in Fig. 8) was sourced directly from IMPLAN in its 536 industry and commodity coding system. The capex spending values from the Annual Capital Expenditures Survey were classified into three high-level categories of spend based on the BEA's Investment in Fixed Assets—Detailed Data for Fixed Assets and Consumer Durable Goods data.[30] Fig. 7 presents this three-category breakout into: track and structures, information and communication equipment, and railroad rolling stock. As described in the text, the railroad rolling stock capex was dropped from the capex spend to avoid double-counting, while the other two categories were aligned with IMPLAN commodity codes.

The national-level impacts presented in chapter 3 were broken into state-level impacts by running 51 separate state-level (including DC) models in IMPLAN. Each of these models was constructed as a Multi-Regional Input Output (MRIO) model with two regions: one for the state in question, and one for the rest of the country. The national model inputs described above were split by state based on the results of our original survey of rail supply industry firms, and based on IMPLAN state-level industry data and inter-state trade data. The sum of state-level results was scaled to match the results from the national modeling.

[29] See www.implan.com.

[30] See https://apps.bea.gov/national/FA2004/Details/Index.htm.

COMPARISON WITH 2018 REPORT

This report is an update to Oxford Economics' 2018 report "Tracking the Power of Rail Supply: The Economic Impact of Railway Suppliers in the U.S,"[31] which estimated the economic impact of the rail supply industry for reference year 2016. The methodology for that report is presented in its Appendix A. Fig. 26 compares the core economic impact results between the current report and that 2018 report.

Fig. 26: Comparison of rail supply industry economic impacts between the current report and its 2018 predecessor

Measure	Source	Reference year	Total	Direct	Indirect	Induced
Employment	Current report	2020	682,426	239,272	191,071	252,082
	2018 report	2016	650,000	125,100	252,100	272,100
	Difference		32,426	114,172	-61,029	-20,018
GDP ($ billions current)	Current report	2020	$75.8	$27.2	$22.2	$25.9
	2018 report	2016	$74.2	$19.9	$29.8	$24.6
	Difference		$1.6	$7.3	-$7.6	$1.3
Labor income ($ billions current)	Current report	2020	$49.0	$19.0	$14.9	$15.1
	2018 report	2016	$43.4	$9.9	$19.5	$14.1
	Difference		$5.6	$9.1	-$4.6	$1.0

Source: Oxford Economics

The total estimated economic impact of the rail supply industry was similar between the two reports, whether measured in terms of employment (a 5% increase) or GDP (a 2% increase in nominal terms). Decomposing these changes in total impacts between the three channels of impact (direct, indirect, and induced), however, shows larger changes in the makeup of these impacts.

The generally larger direct impacts in the current report relative to the 2018 report reflect the somewhat broader definition of the rail supply industry adopted in the current report (the previous report did not consider the capital expenditures of the rail transportation industry), as well as changes in the economic structure of the rail supply industry itself. The generally smaller indirect impacts in the current report reflect changes in the underlying industry, including declines in the output of railroad rolling stock (see Fig. 24), as well as methodological changes in the impact calculation. The induced impacts were more similar in scale between the two reports, as these are driven by direct and indirect labor income, which were similar ($29.4 billion in 2016$ in the 2018 report versus $33.9 billion in 2020$ in the current report).

[31] See https://www.oxfordeconomics.com/resource/431fd99b-cd41-4f3c-8277-a2efc045d0bd/.


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APPENDIX B: STATE-LEVEL IMPACTS

Fig. 27: State-level impacts of the rail supply industry, 2020

United States	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	27,674	22,221	25,882	**75,778**
Employment	239,273	191,071	252,083	**682,426**
Income (millions $)	19,030	14,870	15,115	**49,016**
Taxes (millions $)				**15,405**
Alabama	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	514	434	348	**1,296**
Employment	5,518	4,401	4,105	**14,024**
Income (millions $)	368	280	196	**844**
Taxes (millions $)				**256**
Alaska	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	38	23	29	**90**
Employment	315	184	289	**787**
Income (millions $)	26	14	17	**57**
Taxes (millions $)				**17**
Arizona	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	285	240	324	**849**
Employment	2,778	2,347	3,314	**8,439**
Income (millions $)	208	158	190	**556**
Taxes (millions $)				**170**
Arkansas	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	390	334	237	**960**
Employment	4,611	3,444	2,803	**10,857**
Income (millions $)	265	206	131	**601**
Taxes (millions $)				**215**
California	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	1,944	1,850	2,367	**6,161**
Employment	13,542	13,353	18,209	**45,104**
Income (millions $)	1,270	1,216	1,339	**3,825**
Taxes (millions $)				**1,327**
Colorado	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	352	322	451	**1,125**
Employment	3,403	2,744	4,361	**10,508**
Income (millions $)	271	234	267	**771**
Taxes (millions $)				**225**
Connecticut	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	269	152	310	**731**
Employment	1,715	1,136	2,490	**5,340**
Income (millions $)	204	103	181	**489**
Taxes (millions $)				**167**

Delaware	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	281	64	102	**446**
Employment	1,004	505	990	**2,499**
Income (millions $)	121	36	56	**213**
Taxes (millions $)				**72**
District of Columbia	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	139	61	62	**262**
Employment	822	332	437	**1,592**
Income (millions $)	94	41	38	**173**
Taxes (millions $)				**43**
Florida	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	589	552	688	**1,828**
Employment	6,479	5,767	7,372	**19,617**
Income (millions $)	407	363	396	**1,166**
Taxes (millions $)				**382**
Georgia	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	1,047	705	840	**2,593**
Employment	7,704	6,395	8,595	**22,695**
Income (millions $)	602	442	465	**1,510**
Taxes (millions $)				**482**
Hawaii	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	10	7	14	**31**
Employment	121	75	137	**333**
Income (millions $)	6	5	8	**19**
Taxes (millions $)				**7**
Idaho	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	155	111	125	**391**
Employment	1,996	1,308	1,501	**4,805**
Income (millions $)	121	78	74	**274**
Taxes (millions $)				**88**
Illinois	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	2,050	1,654	1,990	**5,694**
Employment	16,328	12,920	17,660	**46,908**
Income (millions $)	1,387	1,104	1,170	**3,661**
Taxes (millions $)				**1,166**
Indiana	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	635	579	587	**1,801**
Employment	6,624	5,303	6,263	**18,191**
Income (millions $)	461	373	347	**1,181**
Taxes (millions $)				**363**
Iowa	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	371	241	258	**870**
Employment	4,130	2,379	2,943	**9,452**
Income (millions $)	286	153	145	**585**
Taxes (millions $)				**181**

Kansas	Direct	Indirect	Induced	Total
GDP (millions $)	708	384	413	**1,504**
Employment	5,922	3,656	4,427	**14,005**
Income (millions $)	479	255	239	**973**
Taxes (millions $)				**310**
Kentucky	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	338	244	251	**834**
Employment	3,668	2,584	2,879	**9,131**
Income (millions $)	234	161	147	**541**
Taxes (millions $)				**185**
Louisiana	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	597	417	339	**1,354**
Employment	4,689	3,787	3,968	**12,445**
Income (millions $)	331	268	188	**787**
Taxes (millions $)				**249**
Maine	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	86	65	96	**247**
Employment	1,120	803	1,068	**2,991**
Income (millions $)	70	46	56	**171**
Taxes (millions $)				**59**
Maryland	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	271	153	331	**755**
Employment	2,273	1,285	3,016	**6,574**
Income (millions $)	190	102	188	**480**
Taxes (millions $)				**170**
Massachusetts	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	376	248	416	**1,040**
Employment	2,957	1,746	3,465	**8,168**
Income (millions $)	265	172	261	**698**
Taxes (millions $)				**214**
Michigan	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	363	394	473	**1,229**
Employment	3,869	3,697	5,110	**12,676**
Income (millions $)	291	271	289	**851**
Taxes (millions $)				**236**
Minnesota	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	561	427	609	**1,598**
Employment	4,959	3,611	5,910	**14,480**
Income (millions $)	409	291	374	**1,074**
Taxes (millions $)				**236**
Mississippi	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	211	175	144	**529**
Employment	2,912	2,110	1,845	**6,868**
Income (millions $)	154	109	76	**339**
Taxes (millions $)				**120**

Missouri	Direct	Indirect	Induced	Total
GDP (millions $)	739	507	598	**1,844**
Employment	7,181	4,882	6,456	**18,520**
Income (millions $)	504	334	350	**1,188**
Taxes (millions $)				**363**
Montana	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	317	202	225	**745**
Employment	4,077	2,409	2,901	**9,388**
Income (millions $)	245	138	141	**523**
Taxes (millions $)				**176**
Nebraska	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	801	438	521	**1,760**
Employment	8,115	4,361	5,476	**17,952**
Income (millions $)	583	287	293	**1,162**
Taxes (millions $)				**372**
Nevada	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	156	98	129	**383**
Employment	1,482	925	1,231	**3,638**
Income (millions $)	102	61	67	**230**
Taxes (millions $)				**92**
New Hampshire	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	39	40	90	**169**
Employment	396	373	840	**1,609**
Income (millions $)	33	28	54	**115**
Taxes (millions $)				**32**
New Jersey	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	633	432	822	**1,886**
Employment	4,720	3,339	6,930	**14,988**
Income (millions $)	433	306	502	**1,241**
Taxes (millions $)				**463**
New Mexico	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	171	105	98	**373**
Employment	1,919	955	1,124	**3,998**
Income (millions $)	115	55	52	**222**
Taxes (millions $)				**91**
New York	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	1,752	1,046	1,502	**4,301**
Employment	9,497	6,674	11,513	**27,684**
Income (millions $)	1,063	688	887	**2,637**
Taxes (millions $)				**872**
North Carolina	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	524	407	429	**1,360**
Employment	4,167	3,952	4,434	**12,553**
Income (millions $)	305	264	241	**810**
Taxes (millions $)				**251**

North Dakota	Direct	Indirect	Induced	Total
GDP (millions $)	283	153	162	**598**
Employment	2,837	1,260	1,815	**5,912**
Income (millions $)	211	89	96	**396**
Taxes (millions $)				**118**
Ohio	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	961	810	940	**2,711**
Employment	8,000	7,013	9,585	**24,597**
Income (millions $)	596	509	536	**1,641**
Taxes (millions $)				**484**
Oklahoma	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	287	295	251	**832**
Employment	3,464	2,873	2,960	**9,297**
Income (millions $)	223	197	145	**565**
Taxes (millions $)				**167**
Oregon	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	338	324	357	**1,019**
Employment	3,252	3,062	3,673	**9,987**
Income (millions $)	273	236	218	**726**
Taxes (millions $)				**206**
Pennsylvania	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	1,734	1,712	1,805	**5,251**
Employment	14,446	13,992	17,606	**46,044**
Income (millions $)	1,403	1,179	1,122	**3,704**
Taxes (millions $)				**1,043**
Rhode Island	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	28	21	44	**93**
Employment	277	195	439	**910**
Income (millions $)	19	14	26	**59**
Taxes (millions $)				**21**
South Carolina	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	383	360	314	**1,057**
Employment	4,214	3,644	3,686	**11,544**
Income (millions $)	315	237	175	**726**
Taxes (millions $)				**232**
South Dakota	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	162	78	106	**346**
Employment	1,614	806	1,186	**3,605**
Income (millions $)	114	52	63	**229**
Taxes (millions $)				**69**
Tennessee	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	455	386	455	**1,296**
Employment	4,832	3,801	4,732	**13,365**
Income (millions $)	339	267	281	**887**
Taxes (millions $)				**263**

Texas	Direct	Indirect	Induced	Total
GDP (millions $)	2,829	3,157	2,987	**8,974**
Employment	22,604	24,530	30,403	**77,536**
Income (millions $)	1,894	2,270	1,784	**5,947**
Taxes (millions $)				**1,726**
Utah	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	293	213	236	**742**
Employment	2,225	1,988	2,474	**6,687**
Income (millions $)	175	131	130	**437**
Taxes (millions $)				**126**
Vermont	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	36	27	40	**103**
Employment	523	331	449	**1,303**
Income (millions $)	31	19	24	**74**
Taxes (millions $)				**24**
Virginia	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	677	497	682	**1,856**
Employment	6,029	4,205	6,459	**16,693**
Income (millions $)	486	325	363	**1,174**
Taxes (millions $)				**403**
Washington	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	624	420	548	**1,592**
Employment	4,319	3,038	4,336	**11,693**
Income (millions $)	389	265	304	**958**
Taxes (millions $)				**371**
West Virginia	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	217	131	145	**493**
Employment	2,490	1,387	1,771	**5,649**
Income (millions $)	166	86	85	**337**
Taxes (millions $)				**117**
Wisconsin	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	446	423	504	**1,373**
Employment	4,784	4,118	5,393	**14,295**
Income (millions $)	345	289	298	**932**
Taxes (millions $)				**286**
Wyoming	**Direct**	**Indirect**	**Induced**	**Total**
GDP (millions $)	211	106	87	**404**
Employment	2,351	1,086	1,054	**4,491**
Income (millions $)	147	65	44	**256**
Taxes (millions $)				**98**

Source: Oxford Economics

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January 2023

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