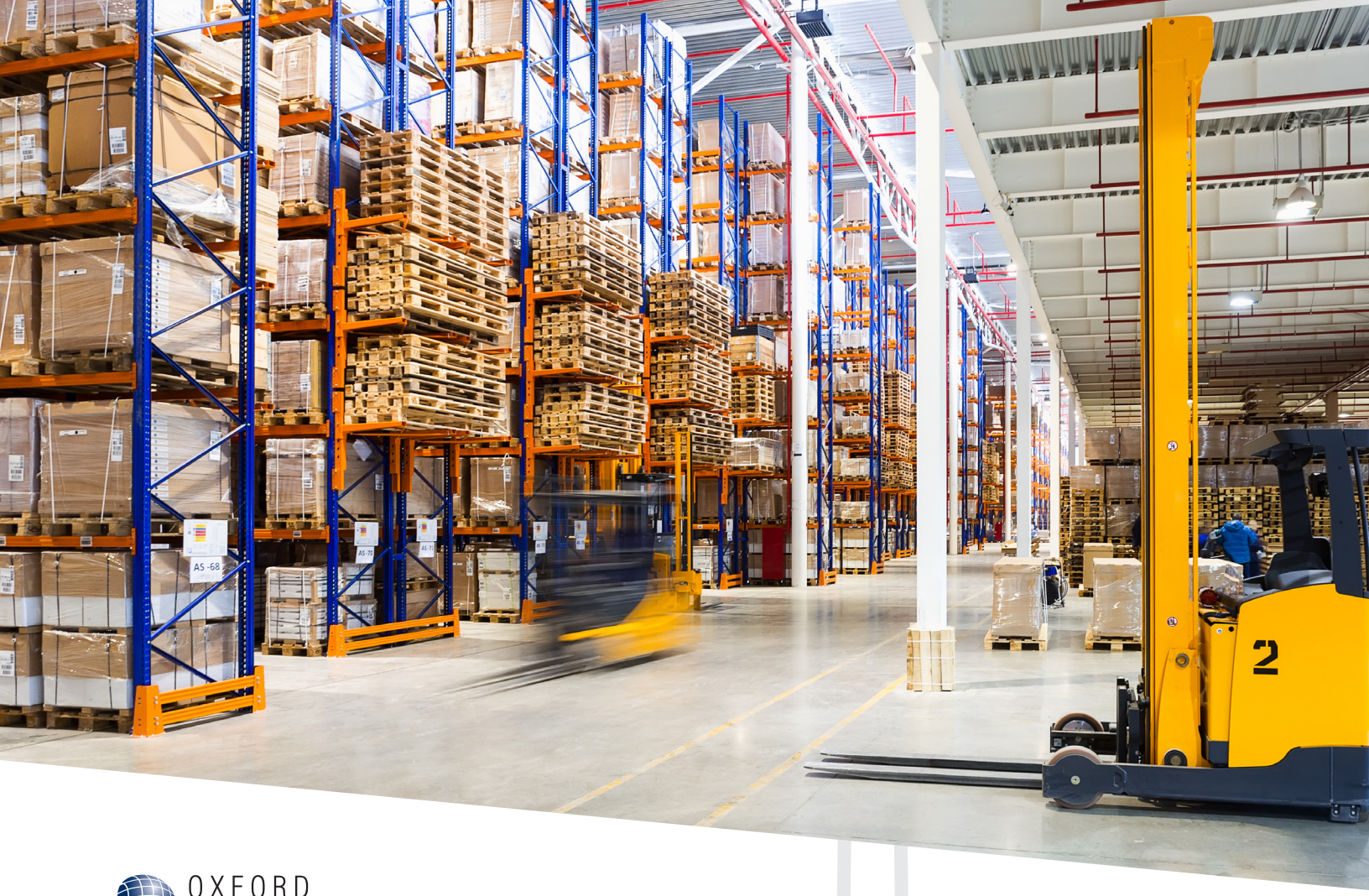


OXFORD ECONOMICS

LIFTING AMERICA

The Economic Impact of Industrial Truck Manufacturers, Distributors and Dealers

INDUSTRIAL TRUCK ASSOCIATION

JUNE 2017

CONTENTS

ABOUT OXFORD ECONOMICS

Oxford Economics was founded in 1981 as a commercial venture with Oxford University's business college to provide economic forecasting and modeling to UK companies and financial institutions expanding abroad. Since then, we have become one of the world's foremost independent global advisory firms, providing reports, forecasts, and analytical tools on 200 countries, 100 industrial sectors and over 3,000 cities. Our best-of-class global economic and industry models and analytical tools give us an unparalleled ability to forecast external market trends and assess their economic, social and business impact.

Headquartered in Oxford, England, with regional centers in London, New York, and Singapore, Oxford Economics has offices across the globe in Belfast, Chicago, Dubai, Miami, Milan, Paris, Philadelphia, San Francisco, and Washington DC. We employ over 300 full-time people, including more than 200 professional economists, industry experts, and business editors—one of the largest teams of macroeconomists and thought leadership specialists. Our global team is highly skilled in a full range of research techniques and thought leadership capabilities, from econometric modeling, scenario framing, and economic impact analysis to market surveys, case studies, expert panels, and web analytics. Underpinning our in-house expertise is a contributor network of over 500 economists, analysts, and journalists around the world.

Oxford Economics is a key adviser to corporate, financial and government decision-makers and thought leaders. Our worldwide client base now comprises over 1000 international organizations, including leading multinational companies and financial institutions; key government bodies and trade associations; and top universities, consultancies, and think tanks.

THE INDUSTRIAL TRUCK ASSOCIATION (ITA)

The Industrial Truck Association is the premier organization for every link in the industrial truck industry supply chain. Composed of original equipment manufacturers and suppliers of component parts and accessories, ITA connects, protects and serves the industry and its members. Highly recognized as a reliable expert among public and private business and a credible source of engineering and statistical information, ITA is the collective voice of the powered industrial truck industry manufacturers. ITA is a tax exempt 501(c)(6) organization, registered in the District of Columbia as a non-profit company.

SPECIAL THANKS TO THE MATERIAL HANDLING EQUIPMENT DISTRIBUTORS ASSOCIATION (MHEDA)

We would like to thank the Material Handling Equipment Distributors Association (MHEDA) for their support in the research conducted for this report. MHEDA is the premier trade association dedicated to serving the material handling business community. Over 600 distributor and manufacturer companies worldwide utilize MHEDA's resources to help their business stay competitive and employees stay connected.

June 2017

To discuss the report further, please contact:

Brian J. Feehan
President
Industrial Truck Association
1750 K Street, NW, Suite 460, Washington, DC 20006
Tel: 202-296-9880
brian.feehan@indtrk.org
www.indtrk.org

or

Hamilton Galloway
Head of Consulting, Americas
Oxford Economics
5 Hanover Square, 19th Floor, New York, NY, 10004
Tel: 646-503-3068
hgalloway@oxfordeconomics.com
www.oxfordeconomics.com

EXECUTIVE SUMMARY

$25.7 billion

The economic contribution of industrial trucks in 2015

209,600 jobs

The number of jobs supported by industrial trucks in 2015

1 million orders

Annual orders of forklifts have grown to over 200,000 units in the US alone and over 1 million worldwide

The industrial truck manufacturing sector has been an important and active part of the American economy for 100 years. Powered industrial trucks, or forklifts, originated in the United States in 1917. Since the first lift truck was manufactured, annual sales have grown to over 200,000 units in the US alone and over one million worldwide.

Over 24,000 workers are employed in the industrial truck manufacturing sector directly, excluding dealers and distributors. Since 2009, these manufacturers have added close to 5,600 jobs. Annual employment growth in the industry averaged 4.5 percent from 2009 to 2015. This exceeds the US average of 1.4 percent annual employment growth over the same period as well as manufacturing annual employment growth of 0.7 percent.

The economic impact of the industrial truck manufacturing sector can be measured using a standard technique known as economic impact analysis. This kind of analysis measures not just the direct (operational) contribution of an industry but also the impact that is felt as its activities ripple out across the economy. This includes, for example, the activities of its supply chain (indirect impact) and the effects that are felt as employees in the industry and its supply chain spend their wages in the wider consumer economy (known as the induced impact). Each of these can be quantified in terms of a contribution to GDP, jobs, and the amount of tax revenue that is generated for the public purse.

The economic contribution of industrial truck manufacturers in 2015 amounted to more than $25.7 billion in GDP, as well as $5.3 billion in taxes to local, state and federal governments. Workers in this sector are highly productive, and wages reflect this at $57,000 annual income on average, placing them above the median income earners in most states.

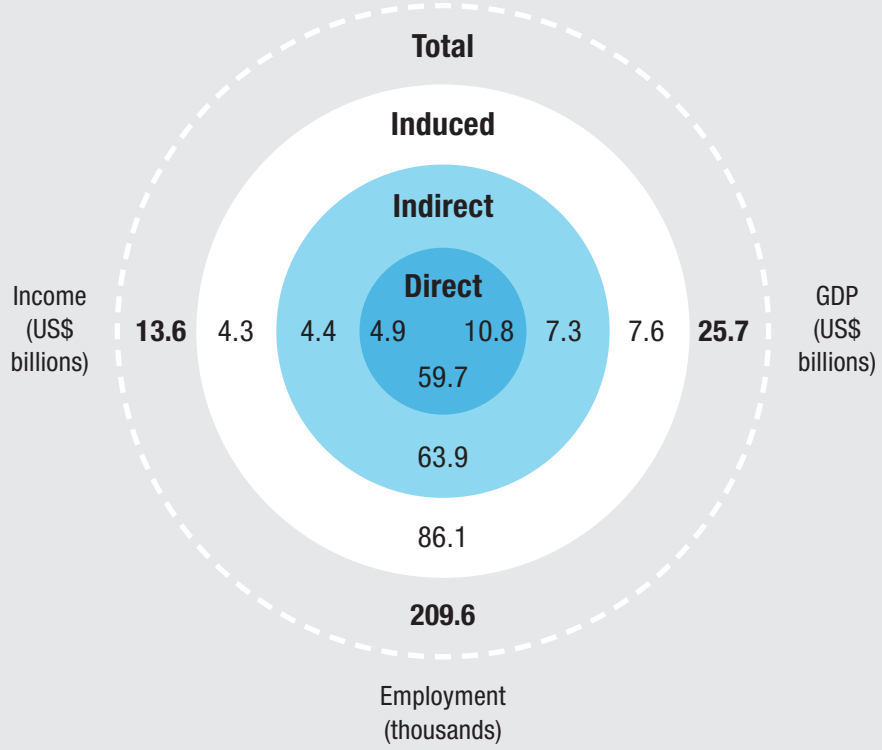
In total, industrial truck manufacturers support more than 209,600 jobs. The firms directly support the employment of more than 59,700 manufacturing employees, sales, and support staff. In addition, for each worker directly employed by the industrial truck sector, a further 2.5 jobs are supported in the wider economy, either in the supply chains of industrial truck manufacturers or through the wage spending of those employed by the firms themselves or their

supply chains. On average, these indirect and induced jobs pay an average annual salary of $50,915.

Industrial truck manufacturers make a widespread contribution throughout the US economy. Of the $25.7 billion total contribution to GDP, some $14.9 billion results from supply chain and consumer spending activities. This spreads the benefits of the sector to other parts of the US economy, including, for example, $3.5 billion in trade, transportation, and utilities; $2.1 billion in professional and business services; and $1.1 billion in education and health services.

Industrial truck manufacturers have a substantial impact in many states. The states where industrial truck firms generated the highest economic impact, in terms of GVA, include Illinois ($3.5 billion), Texas ($2.7 billion), and Ohio ($2.4 billion).

Fig. 1. Economic impact of industrial truck manufacturing on the US, 2015



Source: Oxford Economics, IMPLAN

GLOSSARY OF TERMS

American Community Survey (ACS): An annual household survey conducted by the US Census Bureau that samples about 3.5 million addresses across the US. It provides information on individual socioeconomic and demographic characteristics.

Classes of Industrial Trucks:

- Class 1 – Electric Rider Trucks – Counterbalanced
- Class 2 – Electric Warehouse Rider Trucks
- Class 3 – Electric Warehouse Pedestrian Trucks
- Classes 4 & 5 – Internal Combustion Trucks, Cushion and Pneumatic Tires, Counterbalanced

County Business Patterns (CBP): A US Census program that measures subnational economic data by industry. This series includes the number of establishments, employment during the week of March 12, first quarter payroll, and annual payroll.

Gross Domestic Product (GDP): Produced by the Bureau of Economic Analysis (BEA), GDP is the official economic measure of output in the U.S. economy.

Gross Value Added (GVA): A measure of output less intermediate consumption, it is the gross value added contribution to GDP.

IMPLAN: Economic impact software that uses Input-Output tables showing the relationships between industries to evaluate the full economic contribution of one industry throughout the economy

North American Industrial Classification System (NAICS): The standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the US business economy.

NAICS Code 333924 (Industrial Truck, Tractor, Trailer, and Stacker Machinery Manufacturing): This US industry comprises establishments primarily engaged in manufacturing industrial trucks, tractors, trailers, and stackers (i.e., truck-type) such as forklifts, pallet loaders and unloaders, and portable loading docks.

Occupational Employment Statistics (OES): A Bureau of Labor Statistics (BLS) program that produces employment and wage estimates annually for over 800 occupations.

Quarterly Census of Employment and Wages (QCEW): A Bureau of Labor Statistics (BLS) program that publishes a quarterly count of employment and wages reported by employers covering 98 percent of US jobs.

Standard Occupational Classification (SOC): A system used by Federal statistical agencies to classify workers into occupational categories for the purpose of collecting, calculating, or disseminating data. All workers are classified into one of 840 detailed occupations according to their occupational definition.

1. INTRODUCTION

Powered industrial trucks, or forklifts, originated in the United States in 1917. Since the first lift truck was manufactured, annual sales have grown to over 200,000 units in the US alone and over one million worldwide. Forklifts are used to move and lift materials and offer load capacities from a few thousand pounds up to 180,000 pounds. Powered industrial trucks come in a variety of models including lift trucks, tow tractors, rough terrain vehicles, motorized hand-pallet trucks, and automated guided vehicles and are categorized into seven classes based on characteristics such as engine type, design, and size.

The industrial truck manufacturing sector is substantial, generating output of $10.5 billion and supporting over 24,000 manufacturing jobs in 2015.[1] However, the economic contribution of forklift manufacturing extends far beyond the plants where they are made. The large demand for forklifts facilitates the need for additional support services including retail, leasing, and rental operations; distribution and logistics; and training, maintenance, and repair services. These support activities generate additional economic value throughout the US economy.

Moreover, the use of industrial trucks is integral to virtually every supply chain in every industry. The reliability and versatility of lift trucks enable them to operate in a wide range of indoor and outdoor environments. A well-maintained forklift operated by a well-trained worker is critical to the country's $165 billion material handling industry, making them indispensable to the economy. BLS estimates that there are over 540,000 industrial truck operators currently employed in the US.[2] They operate in all 50 states and work in over 300 different industries. The top employing industries of industrial truck operators include warehousing and storage, employment services, grocery wholesalers, general freight trucking, and building material and supplies dealers.

The uses of industrial trucks vary by purpose and industry. Manufacturers use them to lift and transport goods; airports use them to tow luggage carts and

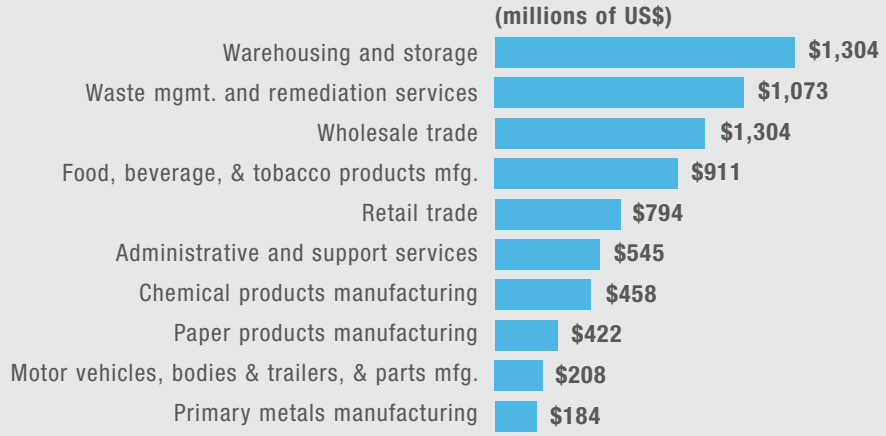
---

1 IMPLAN 2015 gross output of Industrial truck, trailer, and stacker manufacturing.

2 See https://www.bls.gov/oes/current/oes537051.htm.

move goods about the facilities; warehouses use them to stack pallets and organize stock; and construction companies uses them to deliver materials and supplies to locations such as rooftops.

Fig. 2. The top consumers of industrial trucks by industry, 2015*



* This profile represents NAICS 333924 (Industrial Truck, Tractor, Trailer, and Stacker Machinery Manufacturing). It is inclusive of lift trucks within classes 1-7, hand trucks, and other non-power trucks.

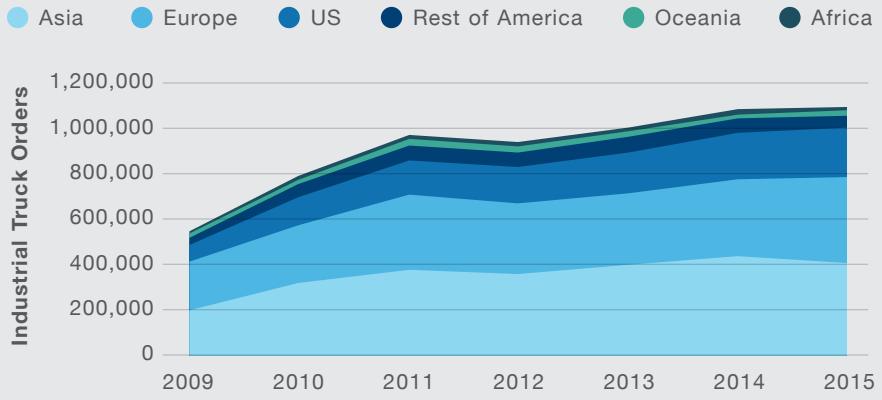
RECENT GROWTH OF INDUSTRIAL TRUCK MANUFACTURING

Since the end of the Great Recession in 2009, orders for industrial trucks have climbed sharply, doubling from a half million units to one million units worldwide. Growth in global orders broadly reflects the global recovery and expansion; the increase in orders was largely fueled by the US, which saw growth of nearly 150 percent during this period, a volume increase of over 130,000 units. This likely stemmed from the need to upgrade or replace aging capital equipment.

The impressive growth seen since 2009 illustrates how important forklift trucks remain for the US economy. Forklifts facilitate the production of goods and services, creating increased efficiencies. This is somewhat of a departure from other manufacturing sectors that might be building a component that goes into a final good or completing final assembly. Instead, industrial trucks play an important functional role in the production process in virtually every industry.

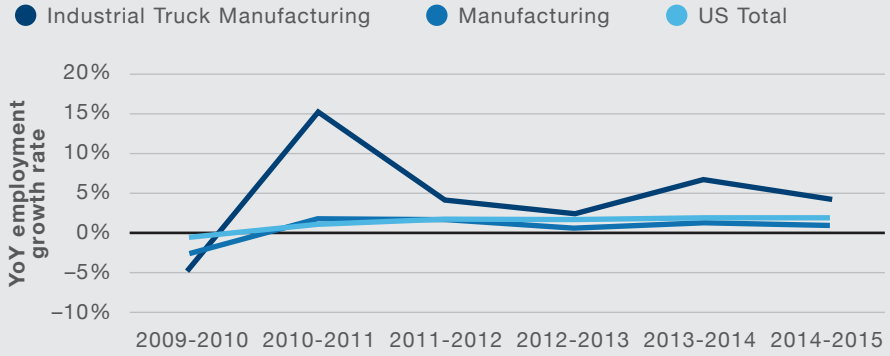
The impressive growth seen above has translated into increased demand for labor within the industry. From 2009 to 2015, the industrial truck manufacturing sector added 5,600 jobs. During this period, annual employment growth in the

Fig. 3. World industrial truck orders, 2009-2015



Source: Oxford Economics, ITA

Fig. 4. Industrial truck manufacturing annual employment growth, 2009-2015



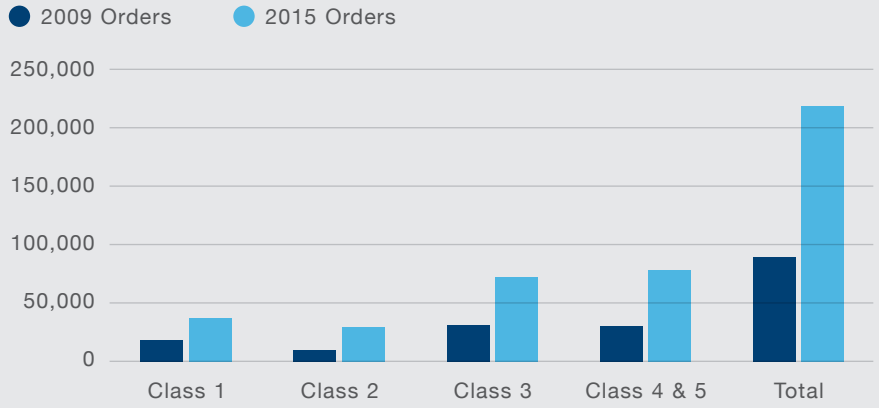
Source: Oxford Economics, BLS QCEW

sector averaged 4.5 percent, with a high of 15.5 percent from 2010 to 2011. This markedly exceeded the US annual average of 1.4 percent employment growth during the same period as well as overall manufacturing annual average employment growth of 0.7 percent.

Looking forward, future demand is expected to be affected by structural factors including the rise of e-commerce and mega warehouses to fulfill online orders, which have implications for demand for forklift trucks. The industry is versatile, responding to the changing needs of forklift users in other industries. Looking at the growth in the various classes of forklifts, it is easy to see how larger forklifts

(Class 4 & 5) are the most popular but Class 2 forklifts experienced the highest growth between 2009 and 2015. Class 2 forklifts are generally described as Electric Motor Narrow Aisle Trucks, and their ability to function in very tight spaces is one reason why demand for this type of truck has increased more recently. Additionally, the growth in warehousing and storage will continue to drive demand for Electric Motor Narrow Aisle Trucks.

Fig. 5. US industrial truck orders by class, 2015



Source: Oxford Economics, ITA

THE PURPOSE OF THIS STUDY

Demand for forklifts, other industrial trucks, and associated services exists in every state throughout the US. While data on units produced, sold, and imported is readily available, an analysis of the economic contribution that industrial truck manufacturing makes to the US economy and individual states has not previously been undertaken. To address this, the Industrial Truck Association commissioned Oxford Economics to conduct research, analysis, and impact modeling to clearly quantify the economic contribution of industrial truck manufacturing and its support services in the US. This report highlights the importance of the industry to the US economy in terms of jobs, wages, tax revenue, and GDP.

For this study, the industrial truck sector includes manufacturing activities, management, dealers, and leasing and finance activities related to the manufacture, sale, and distribution of industrial trucks. Oxford Economics quantified the economic contribution nationally and by state using an economic impact analysis—as described in the following box.

AN INTRODUCTION TO ECONOMIC IMPACT ANALYSIS

A standard economic impact assessment identifies three channels of impact that stem from an activity:

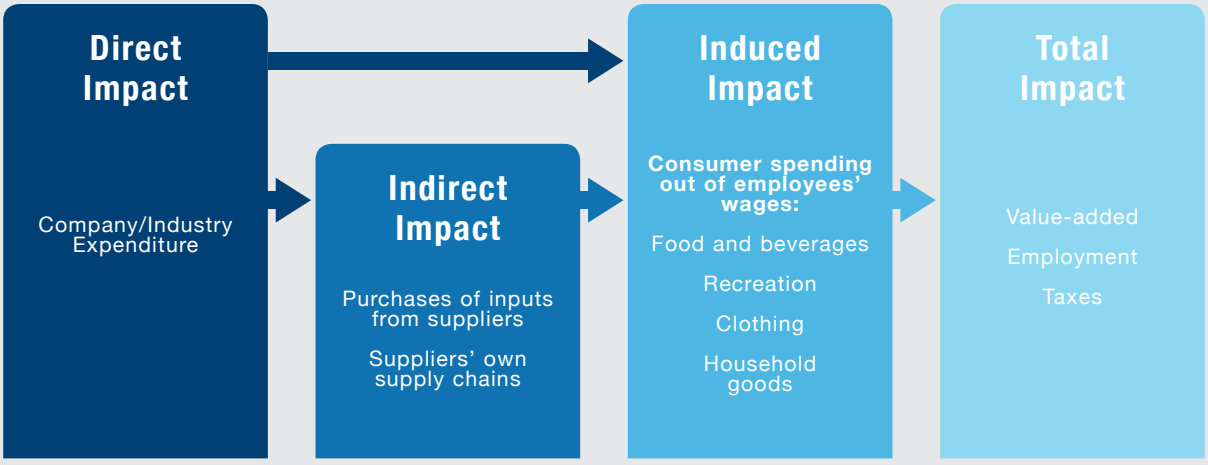
- **Direct effect**, which measures the economic benefit of industrial truck manufacturing, sales, and distribution operations and activities in the US.
- **Indirect effect**, which encapsulates the activity driven by the supply chain as a result of the procurement of goods and services from other businesses.
- **Induced effect**, which captures the impact of workers spending their wages on locally produced goods and services. This supports activity across the spectrum of consumer goods and services, and their supply chains. An example of this is the purchases a worker makes using his wages, including groceries, clothing, transportation, and utilities.

In accordance with standard economic impact assessments, the scale of the impact of industrial truck manufacturers is measured using four key metrics:

- **GVA**—the gross value added (GVA) contribution to GDP.
- **Employment**—employment is measured in terms of headcount of workers.
- **Wages**—the compensation paid to workers within the industry, the industry's supply chain and induced wages paid to workers in consumer industries.
- **Taxes**—gross tax receipts paid at federal, state and local levels.

All monetary impacts in this report are presented in current 2015 (i.e. non-inflation adjusted) US$.

The channels of economic impact



CASE STUDY 1:
LIFT TRUCK TECHNOLOGICAL AND DESIGN ADVANCEMENTS

A key driver of any production process is the movement of value-added goods—whether from one part of a manufacturing facility to another or across large geographies in order to continue the production process. Growth and expansion in consumption, domestic production, transportation and global trade have combined to push increasing demand for improvements in logistics and distribution productivity. Organizations seek to improve their operations and increase efficiencies throughout their supply chain, and many have turned to technology to assist in improving these efficiencies. Warehouses are becoming increasingly advanced in their use of technology to automate systems and track products. The industrial truck industry has responded to this changing environment by equipping powered lift trucks with new technology and advanced capabilities, thereby allowing more choices for purchasers and flexibility in materials movement. The following are a few of the new advancements in lift truck technology that are streamlining operations, reducing costs, and increasing the bottom line.

Automated Guided Vehicles and Automated Lift Trucks

As storage facilities become more efficient and compact, lift trucks must be designed to allow for navigation through tight quarters. Within these tight spaces, AGVs can help reduce accidents by helping operators to navigate blind spots, avoid collisions with pedestrians, and steer around corners and within narrow aisles. AGV technology relies on two types of systems: Passive and Active.* Passive Systems use cameras, lasers, and/or buzzers to alert the forklift operator when an obstacle obstructs the path of the forklift. Active Systems require specific types of sensors, either on the forklift or employees, which transmit data to the operator. If the system detects any obstacles in a specific zone or path, it triggers an alert the driver to stop the forklift. Through the use of AGV technology, some users reported reduction in damage of up to 90 percent.**

Telematics

By combining telecommunications with sensor technology, the industry has increased efficiency through improved maintenance and repair alerts, improved energy usage, and most importantly weight and balance controls. Recently, there has been increased demand for forklifts that can operate for longer shifts and in different environments. For example, in many grocery stores, which operate around the clock, forklifts may go from the climate controlled storage rooms, to cold storage, and even outdoors in all types of weather.*** As a result, both the forklift itself and its power source must be able to handle the dramatic changes in temperatures.

Integrated Mobile Applications

Use of mobile technology, such as tablets with specialized applications linked to warehouse management systems or equipped with the capability of entering data through scanning or RFIDs can streamline operations and reduce costs. This can happen through optimizing order fulfillment or preventing mis-shipments through automated identification—among other cost savings and operational benefits.

* Sick Sensor Intelligence. (2016). How Automation Technologies Improve Operating Efficiency and Reduce Collisions on Manned Forklifts. USA.

** Brown, J. (2013, July). Lift Trucks on the Rise. Retrieved Feb 10, 2017, from Inbound Logistics: http://www.inboundlogistics.com/cms/article/lift-trucks-on-the-rise/

*** Reddon, T. (2014, Aug 5). Advancements in Lift Truck Technology. Retrieved Feb 11, 2017, from Humantech: http://www.humantech.com/advancements-in-lift-truck-technology/

2. THE ECONOMIC IMPACT OF INDUSTRIAL TRUCK MANUFACTURING

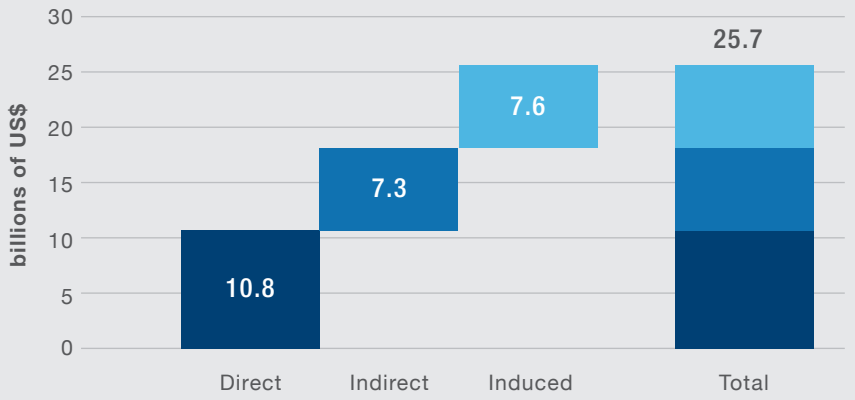
Industrial truck manufacturing, dealers, and distributors have a considerable economic footprint in the US. Tens of thousands of people work in the industry, designing, manufacturing, distributing, servicing, and operating forklifts for businesses throughout all states in the US. The purchases made by the industry from suppliers during the manufacturing process (i.e. the indirect effects) enable further activity throughout the US, sustaining thousands of more jobs across the country. Finally, wages paid to employees, and those employed in the supply chain, fund consumer spending (i.e. the induced effects), for example in retail and leisure establishments, and deliver additional economic benefit to the US.

In the following section, we quantify the industry's economic footprint in terms of its contribution to GDP, the employment it supports and the tax revenues it generates at the federal, state and local level. In this chapter, we explore the three core channels of impact, starting with the direct contribution of industrial truck manufacturers, dealers, and distributors.

GDP IMPACT OF INDUSTRIAL TRUCKS

Combining all the channels of impact—direct, indirect (supply chain) and induced (wage spending)—the total impact of industrial truck manufacturers on the US economy amounted to $25.7 billion in 2015, equivalent to about 0.1 percent of the total US economy (note: US nominal GDP was $18.0 trillion in 2015). The chart below shows the breakdown of this impact across the three core channels, in terms of GVA contribution to GDP. We subsequently explore each channel of impact in turn.

Fig. 7. The total GVA contribution of industrial trucks, 2015



Source: IMPLAN, Oxford Economics

Direct impact

The direct impact of industrial truck firms comprises the value-added production of the sector; those employed directly by manufacturers as well as their dealer and distributor operations, the wages these firms pay, their corporate profits, and the taxes that they pay. We estimate directly accounted for $10.8 billion in GDP, of which $3.3 billion was employee compensation.

A comparison of the total impact with the direct impact reveals how, for every $100 of value-added output created by industrial truck firms, a further $140 of value added is created in other sectors of the US economy as a result of supply chain and employee expenditure impacts. This means that the sector has a value-add multiplier impact of 2.4, which is equivalent to that of breweries, and just below that for aircraft manufacturing, and far exceeds that for legal services, for example.

Indirect impact

The indirect impact of industrial truck firms reflects the employment and GDP contribution made by the suppliers of those firms (e.g. parts suppliers, IT support, and legal services) and, in turn, within the supply chains of those suppliers. In 2015, the GDP contribution of these suppliers was $7.6 billion, of which $3.9 billion was employee compensation.

Induced impact

The induced impact of industrial truck firms represents the economic activity supported by the consumer spending of wages by those employed directly by industrial truck firms or in their supply chains. As a result of the industrial truck firms and their suppliers' employees spending their wages in the economy, we estimate the induced impact that is attributable to industrial truck firms' operations to be a $7.6 billion contribution to GDP in 2015. This includes $3.7 billion in employee compensation.

GDP IMPACT BY SECTOR

The economic impact of industrial truck firms' activities is spread throughout the economy as the employees and suppliers of industrial truck manufacturing firms spend their incomes purchasing goods and services from all types of other businesses including restaurants, power companies, health care services, etc. The impact at sector level is calculated using an input-output modeling framework. These inter-industry relationships are used to calculate the multipliers, or the ripple effects of industrial truck manufacturers' activities, which, in turn, support activity in other sectors of the economy.

The total GDP impact (direct + indirect + induced) of industrial truck manufacturers is displayed in Fig. 8. It is broken down into the major sectors of the US economy. Industrial truck manufacturers' direct impact is concentrated in the manufacturing sector as well as in the finance sector (sales, rental, and leasing activities). Not surprisingly, these two sectors (manufacturing and financial activities) are the sectors where industrial truck firms have the greatest overall national impact ($16.6 billion). In fact, 65 percent of industrial truck firms' overall Gross Value Added (GVA) impact is captured in these sectors.

Still, 35 percent of industrial truck manufacturers' GVA impact is generated in a diverse set of sectors outside of manufacturing and finance. Outside of those mentioned already, there are three sectors where industrial truck firms have a significant impact: trade, transportation, and utilities (14 percent); professional and business services (8 percent); and education and health services (4 percent).

For scalability and comparison, if the industrial truck sector were represented as a country, the industry would fall between El Salvador and Uganda. Fig. 7 illustrates this comparison, along with similar sized countries in terms of GDP.

Fig. 8. Industrial truck manufacturers' GVA impact by sector

Sector	Direct	Indirect	Induced	Total
	$ in millions			
Natural Resources and Mining	0.0	161.6	170.8	332.5
Construction	0.0	58.0	76.0	134.1
Manufacturing	3,163.8	1,968.8	654.7	5,787.3
Trade, Transportation, and Utilities	0.0	2,104.6	1,413.1	3,517.7
Information	0.0	261.8	371.5	633.2
Financial Activities	7,639.8	1,015.6	2,170.1	10,825.5
Professional and Business Services	0.0	1,293.8	794.3	2,088.1
Education and Health Services	0.0	0.9	1,050.0	1,051.0
Leisure and Hospitality	0.0	143.4	489.8	633.2
Other Services	0.0	227.2	326.1	553.4
Government	0.0	36.5	72.9	109.4
Total	10,803.6	7,272.3	7,589.4	25,665.3

Source: IMPLAN, Oxford Economics

Fig. 9. Country comparison of industrial truck GDP contribution, 2015

Country	GDP
Nominal GDP, in billions of US$	
Paraguay	27.7
Latvia	27.0
Trinidad and Tobago	25.9
El Salvador	25.9
Industrial Trucks	**25.7**
Uganda	25.3
Estonia	22.5
Zambia	21.2
Nepal	20.7

Source: Oxford Economics, IMPLAN

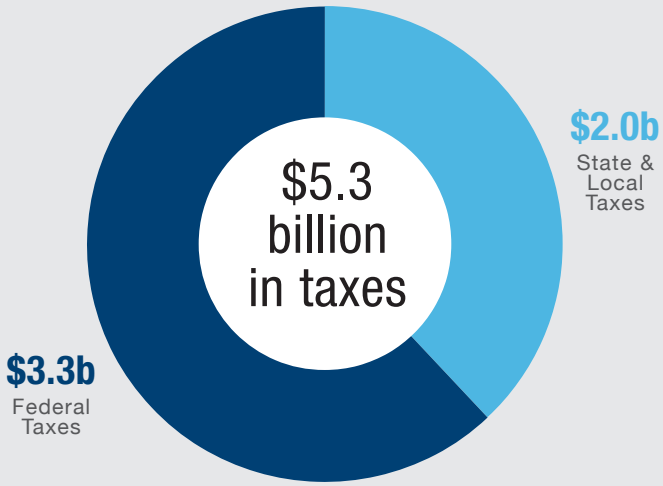
TAX IMPACT OF INDUSTRIAL TRUCKS

The direct, indirect, and induced economic activity supported by industrial truck firms generated $3.3 billion in federal tax revenue in 2015 and an additional $2.0 billion in state and local tax revenue. In total, the economic activity that Industrial truck firms generated was worth over $5.3 billion in taxes for all levels of government. In total each job created by the industry's activity results in $25,400 in additional tax revenue (from all sources).

$3.3 billion in federal tax revenue

$2.0 billion state and local tax revenue.

Fig. 10. Industrial truck tax impact, 2015



3. THE EMPLOYMENT IMPACT OF INDUSTRIAL TRUCK MANUFACTURING

As well as its GDP and tax impact, the industrial truck industry directly employs 59,700 people. Industrial truck manufacturers account for approximately 24,800 while dealers and distributors employ approximately 34,900. On top of this, industrial truck firms indirectly supported an additional 63,900 jobs through its supply chain. We estimate that a further 86,100 induced jobs were sustained as employees of the industry and its supply chain spent their wages on consumer goods. In total, the economic activity of industrial truck manufacturing supports 209,600 jobs throughout the US economy.

Different sectors impact the US economy in very different ways. The best way to compare is evaluating jobs and value-add multipliers. Overall, these figures mean that the industrial truck industry has a jobs multiplier of 3.5. For every direct job in the industry, a further 2.5 jobs are supported elsewhere in the economy. This is higher than several comparable industries, such as iron and steel forging and boat building. The table below displays the job and value-add multiplier of different sectors in the US.

Fig. 11. Multipliers of industrial trucks compared to other sectors, 2015

Sector	Jobs Multiplier	Value-Add Multiplier
Breweries	5.1	2.4
Aircraft manufacturing	4.1	2.5
Industrial trucks	3.5	2.4
Iron and steel forging	2.9	2.5
Boat building	2.2	2.8
Greeting card publishing	1.6	1.5
Hospitals	1.6	1.6
Legal services	1.5	1.3

Source: IMPLAN, Oxford Economics

JOBS IMPACT BY SECTOR

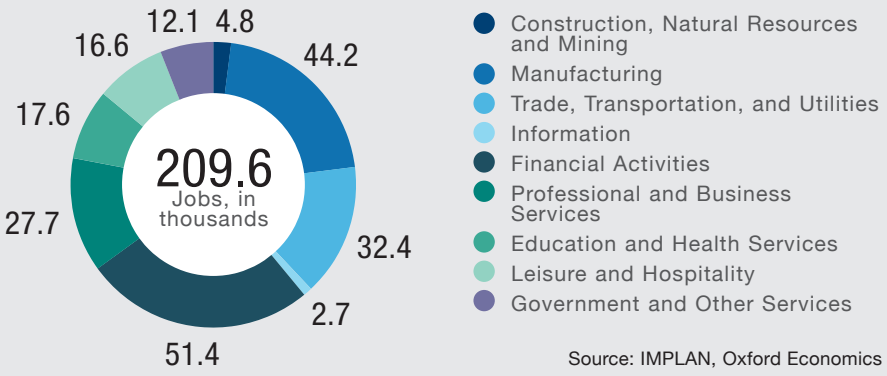
The total employment impact (direct + indirect + induced) of industrial truck manufacturers is displayed in Fig. 12 and Fig. 13 (below). Similar to the GVA impact, the industry's employment impact is concentrated in the manufacturing and financial services sectors, which account for 46 percent of the total employment impact. This is followed by trade, transportation, and utilities (15 percent); professional and business services (13 percent); and education and health services (8 percent).

Diverse Job Creation:

54%

of all jobs created by industrial truck manufacturing and distribution activity are in industries other than manufacturing and finance.

Fig. 12. Total industrial truck jobs impact by sector



Source: IMPLAN, Oxford Economics

Fig. 13. Detail industrial truck manufacturers' jobs impact by sector

Sector	Direct	Indirect	Induced	Total
	Jobs, in thousands			
Natural Resources and Mining	0.0	0.9	2.0	2.9
Construction	0.0	0.8	1.1	1.9
Manufacturing	24.8	15.3	4.1	44.2
Trade, Transportation, and Utilities	0.0	14.8	17.6	32.4
Information	0.0	1.2	1.5	2.7
Financial Activities	34.9	6.5	10.0	51.4
Professional and Business Services	0.0	17.0	10.8	27.7
Education and Health Services	0.0	0.0	17.6	17.6
Leisure and Hospitality	0.0	3.9	12.7	16.6
Other Services	0.0	3.0	8.1	11.1
Government	0.0	0.3	0.7	1.0
Total	59.7	63.9	86.1	209.6

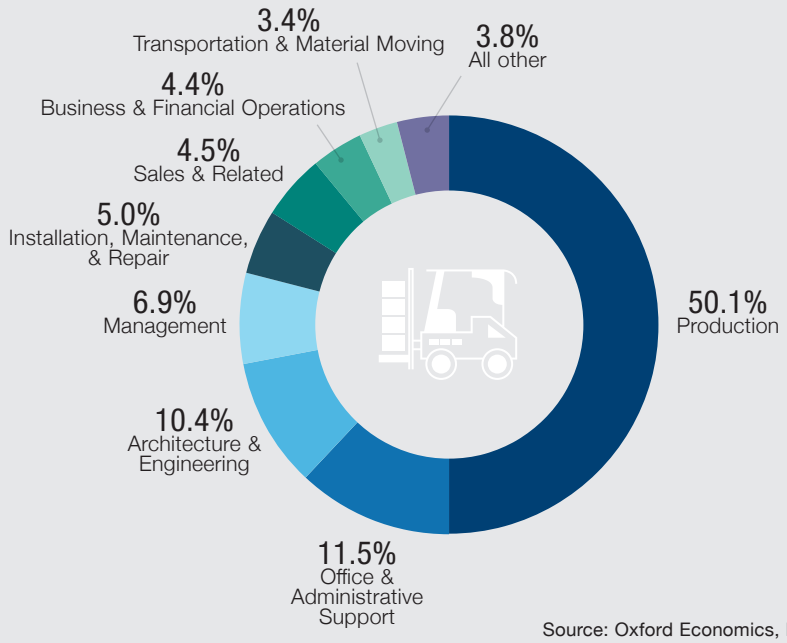
Source: Oxford Economics, IMPLAN

OCCUPATIONAL PROFILE OF INDUSTRIAL TRUCK MANUFACTURING

The occupation profile of firms in the industrial truck manufacturing sector describes the types of jobs that make up the industry.[3] The major occupation group that has the largest share of employment within the industry is, as expected, production occupations, which account for about 50 percent of workers. These workers are responsible for the assembly and final production of lift trucks and are comprised of team assemblers; machinists; welders; and supervisors of production and operating workers.

Beyond production, several other functions are essential to the production of forklifts, including office and administrative support occupations that comprise about 11 percent of workers, architectural and engineering occupations that make up about 10 percent, and management occupations, which account for about 7 percent of workers in the industry.

Fig. 14. Occupation profile of the industrial truck manufacturing



Source: Oxford Economics, BLS OES

3 This profile represents NAICS 3339, Other General Purpose Machinery Manufacturing, which is the most detailed NAICS code available for occupational data from BLS. It is inclusive of NAICS 333924 (Industrial Truck, Tractor, Trailer, and Stacker Machinery Manufacturing).

CASE STUDY 2:
CHANGES IN THE OCCUPATIONAL STAFFING PATTERNS

Since 2002, the industrial truck manufacturing workforce has grown by a modest 2 percent. After experiencing a sharp decline during the Great Recession in 2009, the industry is looking to improve its efficiency and productivity. A key component of productivity is the structure of its workforce. This section evaluates the changes in the industrial truck manufacturing workforce and the shifts in the occupational composition of the industrial truck manufacturing industry using historical industry staffing pattern matrices between 2002 and 2015.

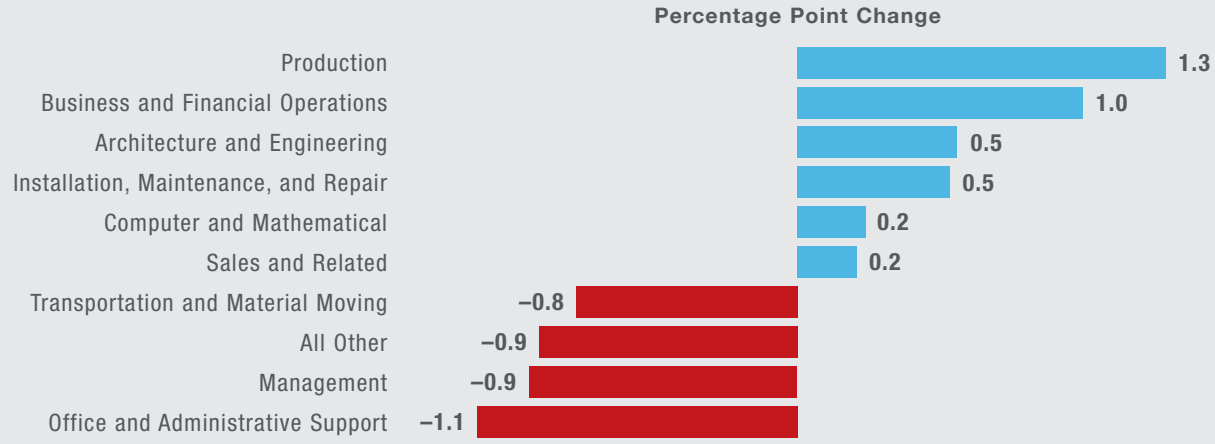
Industrial truck manufacturing experienced significant changes in the share of Production as well as Business and Financial occupations, both of which gained over 1 percentage point of industrial truck manufacturing employment share from 2002 to 2015. In contrast, Office and Administrative occupations saw the largest decline in terms of industry employment share followed closely by Management occupations.

In terms of occupational growth, Business and Financial as well as Computer and Mathematical occupations experienced the largest relative increases within the industry—as shown in Fig. 16. These occupations are comprised of highly skilled jobs that typically require a college degree. These increases largely reflect the recent demand for supply chain management and big data analytics skill sets.

Construction occupations (within All Other) accounted for the largest relative decline followed by Transportation and Material Moving occupations. Some of the efficiencies gained by implementing better supply chain management systems may also be reflected in the decline of Transportation and Material Moving occupations.

Note: Transportation occupations lost significant employment share, due in part to the third party outsourcing by manufacturing companies to transportation logistics companies.

Fig. 15. Changes in the share of industrial truck manufacturing workforce, 2002-2015



Source: Oxford Economics, BLS OES

Fig. 16. Occupational growth in the industrial truck manufacturing workforce, 2002-2015

Occupation Group	2002	2015	Relative Change 02-15	Abs Change 02-15
Business and Financial Operations	803	1,055	253	31.5%
Computer and Mathematical	316	377	61	19.2%
Installation, Maintenance, and Repair	1,053	1,200	147	13.9%
Architecture and Engineering	2,298	2,473	176	7.6%
Sales and Related	1,000	1,067	67	6.7%
Production	11,443	11,969	526	4.6%
Office and Administrative Support	2,956	2,745	-211	-7.1%
Management	1,833	1,644	-189	-10.3%
Transportation and Material Moving	967	800	-168	-17.3%
All Other	743	541	-202	-27.2%

Source: Oxford Economics, BLS OES

Fig. 17. Examples of detailed occupations, 2015

SOC Code	Occupation	Industrial Truck Employment
11-0000	Management Occupations	
11-1021	General and Operations Managers	468
11-3051	Industrial Production Managers	329
11-9041	Architectural and Engineering Managers	189
13-0000	Business and Financial Operations Occupations	
13-1023	Purchasing Agents, Except Wholesale, Retail, and Farm Products	336
13-2011	Accountants and Auditors	223
13-1161	Market Research Analysts and Marketing Specialists	107
15-0000	Computer and Mathematical Occupations	
15-1132	Software Developers, Applications	98

SOC Code	Occupation	Industrial Truck Employment
15-1142	Network and Computer Systems Administrators	79
15-1151	Computer User Support Specialists	68
17-0000	Architecture and Engineering Occupations	
17-2141	Mechanical Engineers	916
17-2112	Industrial Engineers	436
17-3013	Mechanical Drafters	277
41-0000	Sales and Related Occupations	
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	690
41-4011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	154
41-9031	Sales Engineers	128
43-0000	Office and Administrative Support Occupations	
43-5071	Shipping, Receiving, and Traffic Clerks	475
43-4051	Customer Service Representatives	359
43-9061	Office Clerks, General	325
49-0000	Installation, Maintenance, and Repair Occupations	
49-9041	Industrial Machinery Mechanics	372
49-9071	Maintenance and Repair Workers, General	306
49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers	102
51-0000	Production Occupations	
51-2092	Team Assemblers	2,936
51-4041	Machinists	1,591
51-4121	Welders, Cutters, Solderers, and Brazers	1,558
53-0000	Transportation and Material Moving Occupations	
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	459
53-7051	Industrial Truck and Tractor Operators	118
53-7064	Packers and Packagers, Hand	80

Source: Oxford Economics, BLS OES

PEOPLE WHO WORK IN INDUSTRIAL TRUCK MANUFACTURING

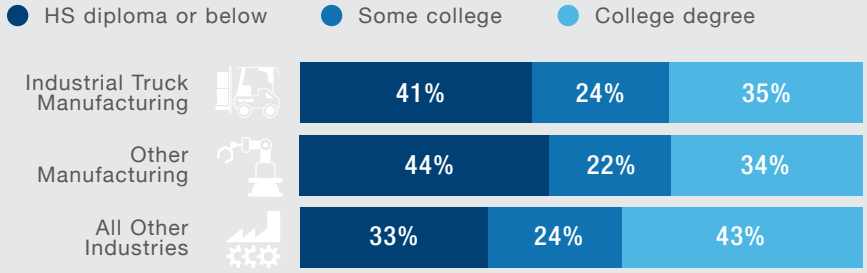
This section considers the socioeconomic characteristics of the industrial truck manufacturing industry. The data come from the 2015 American Community Survey (ACS). It includes all workers currently employed in the industrial truck manufacturing industry as well as a comparison to all other employed workers in the US.

Both the industrial truck manufacturing industry and all other manufacturing workforces show fewer college degrees compared to all other industries. This, however, highlights how the industrial truck industry is an increasingly rare example of a thriving blue-collar industry, in which opportunities exist for workers to gain skills and earn family-sustaining wages.

35% degree educated

35% of industrial truck manufacturing workers have a college degree.

Fig. 18. Educational attainment in the industrial truck manufacturing sector



Source: Oxford Economics, ACS

Fig. 19. Veteran status in the industrial truck manufacturing sector

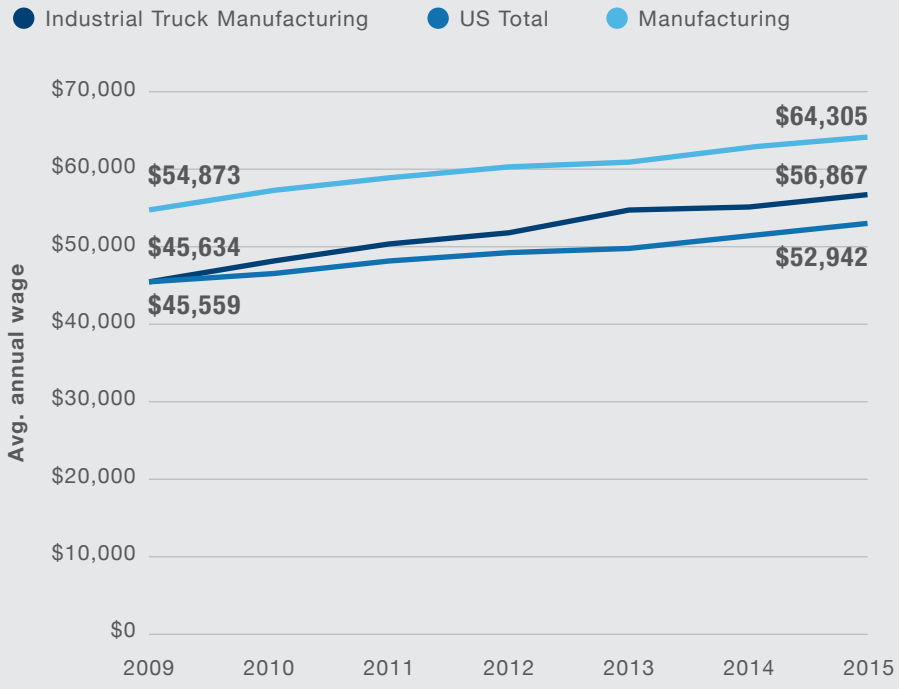
Source: Oxford Economics, ACS

The industrial truck manufacturing industry workforce has a greater share of veterans compared to all other manufacturing as well as all other industries. This indicates that there may be a strong alignment between the skills veterans learn during military services and the skills required to work in the industry, such as teamwork and problem solving, or operating in a busy manufacturing environment or warehouse space while using highly technical equipment. As the industrial truck manufacturing sector ages, this could provide a useful pool of talent to recruit and replace the retiring workforce.

WAGES IN THE INDUSTRIAL TRUCK MANUFACTURING SECTOR

As demand for lift trucks increases, the increase in demand for labor within the industrial truck manufacturing sector bodes well for employees. Average wages within the industry increased by nearly 25 percent from 2009 to 2015. This exceeded the US average annual wage growth of 16 percent as well as manufacturing average annual wage growth of 17 percent over the same period.

Fig. 20. Industrial truck manufacturing average annual wage, 2009-2015



Source: Oxford Economics, BLS QCEW

These wage gains have helped establish the industrial truck manufacturing sector as a reliable and prosperous path to the middle class. In 2015, average annual wages in the sector reached nearly $57,000, which exceeded the US average of just under $53,000.

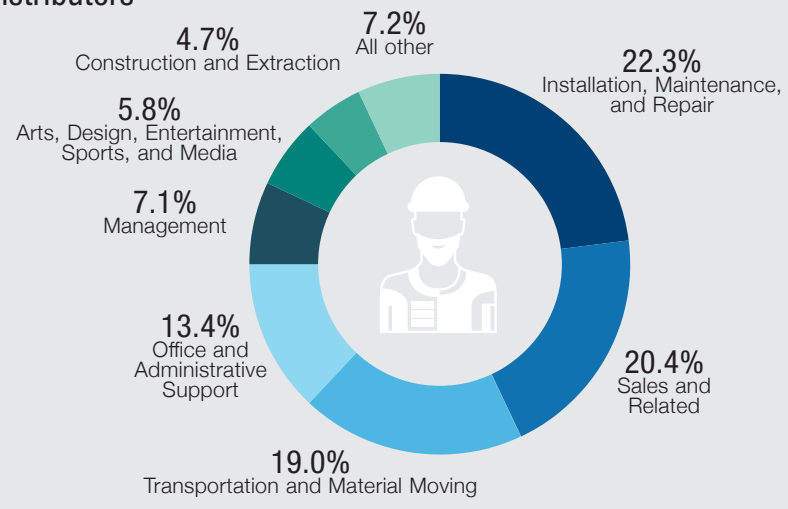
JOBS IN THE DEALER NETWORK

Consumers have access to all their forklift needs throughout the US, whether they are buying, leasing, or renting forklifts. A majority of manufacturers maintain relationships with independent dealers, while some firms operate wholly-owned retail distribution branches. In either case, these dealerships can be found in all 50 states throughout the US. Moreover, dealerships provide multiple services including sales, rental, and leasing services; maintenance and replacement parts; as well as safety training, job planning, and on-site operation.

Due to the variety of services offered by these dealers, a large range of skillsets can be found within the dealerships and distributor firms. In contrast to manufacturing, dealership occupations are less concentrated in one particular group, and instead spread across four major categories, including:

- Installation, Maintenance, and Repair (22 percent)
- Sales and Related (20 percent)
- Transportation and Material Moving (19 percent)
- Office and administration support (13 percent)

Fig. 21 Occupation profile of industrial truck dealers and distributors



Source: Oxford Economics, BLS OES

4. STATE-LEVEL DETAIL

Industrial truck firms have the largest impact in Illinois.

The top six states, in terms of GVA, account for 50% of industrial truck economic impact nationwide.

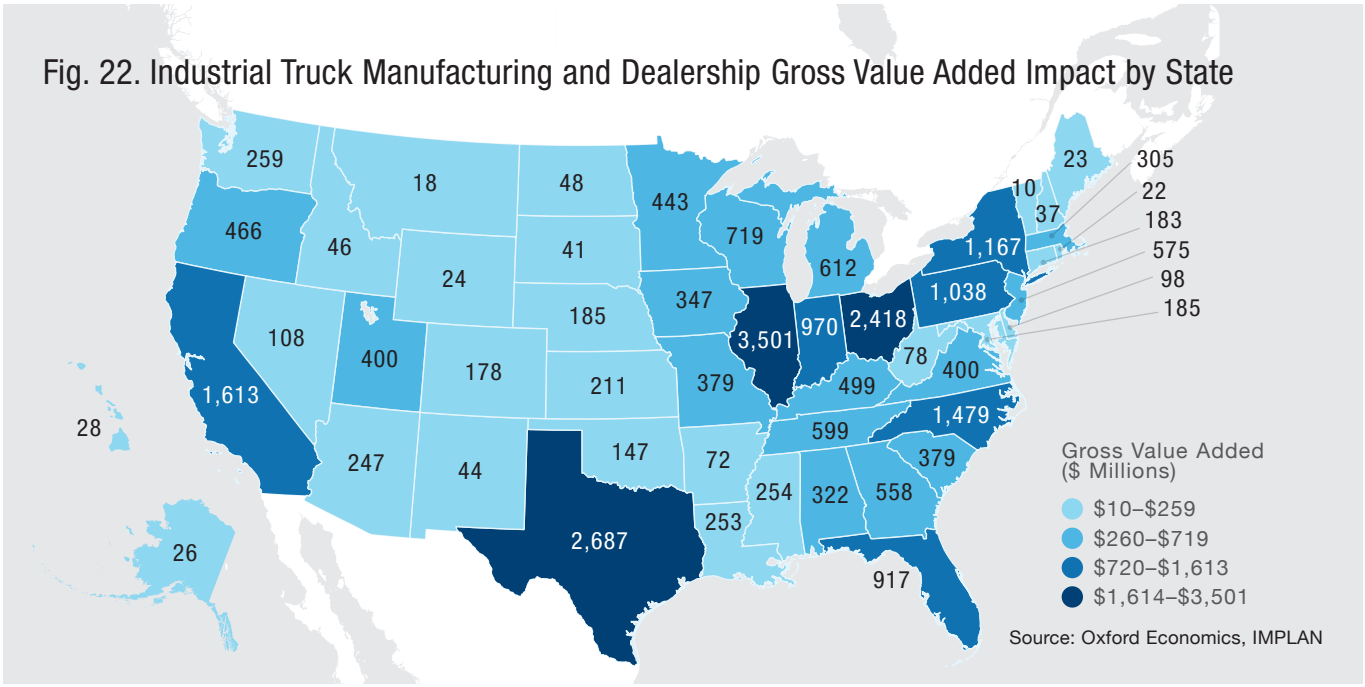
Industrial truck firms have operations in all 50 states throughout the US and are represented by manufacturer, dealer, and distributor establishments. These industrial truck firms have a substantial impact in Midwest states, many of whom operate in areas that have experienced declining employment in manufacturing. As a result, industrial truck firms make a disproportionately large impact in this region.

GVA IMPACTS BY STATE

The states where industrial truck firms generated the highest economic impact, in terms of GVA, include Illinois ($3.5 billion), Texas ($2.7 billion), and Ohio ($2.4 billion). The top six states where industrial truck firms had the greatest impact account for half of industrial truck manufacturing economic impact nationwide. They include California ($1.6 billion), North Carolina ($1.5 billion), and New York ($1.2 billion).

Fig. 22 presents a map that shows, in absolute dollar terms, how industrial truck firms' economic impact differs by state.

Fig. 22. Industrial Truck Manufacturing and Dealership Gross Value Added Impact by State



LOCATION QUOTIENTS

A location quotient (LQ) for an industry helps to illustrate how concentrated it is in each state compared to others. Location quotients equal to one indicate that the state's industry concentration is equal to the national concentration of the same industry. Industries with higher location quotients (usually greater than 1.2) indicate that a region has a higher concentration in the production of that good or service, relative to the rest of the nation.

A value of 1.5 indicates that industry output within the region is 1.5 times more concentrated than the US average. A location quotient below one indicates that industry output within the region is less concentrated compared to the US average.

Note: High output industries do not necessarily result in high location quotients, as this statistic is relative to national output. For example, if automobile manufacturing makes up 0.6 percent of output in Michigan and only 0.1 percent of output in the US, then Michigan's LQ for car manufacturing would be 6.9 (0.6%/0.1%).

As noted above, GVA in the industrial truck industry is largest in Illinois, Texas, Ohio, California, and North Carolina. However, of the top five states, only Illinois, Ohio and North Carolina are ranked high in terms of LQ. The other states with high LQs include Indiana and Utah. This indicates, for example, that the economy of Utah is more reliant on industrial truck manufacturing and distribution compared to Texas, even though Texas has a higher output being produced by the industry.

Fig. 23. Industrial truck manufacturing employment by state, 2015

Top GVA States			Top LQ States		
State	GVA (in billions)	LQ	State	GVA (in billions)	LQ
Illinois	$3.5	3.2	Illinois	$3.5	3.2
Texas	$2.7	1.2	Ohio	$2.4	2.8
Ohio	$2.4	2.8	North Carolina	$1.5	2.1
California	$1.6	0.5	Indiana	$1.0	2.0
North Carolina	$1.5	2.1	Utah	$0.4	1.9

Source: Oxford Economics, IMPLAN

5. CONCLUSION

Industrial truck manufacturing is a vital and growing industry in America. The sector's ability to offer a variety of products and services to all types of customers is evidenced by the geographic distribution and economic contribution to all 50 states. In fact, BLS estimates that there are nearly 540,000 industrial truck operators employed in the US across hundreds of different industries.

The use of industrial trucks is essential to virtually every supply chain in every industry, making them indispensable to the economy. Not only do industrial truck manufacturers produce these vital pieces of equipment; they also provide additional support services such as retail, leasing, and rental operations; distribution and logistics; and training, maintenance, and repair services that generate additional economic value throughout the economy.

In total, industrial truck manufacturers support employment of nearly 209,600 workers in the US and generate over $25.7 billion in economic activity. This economic activity is greatest in the Great Lakes states that are facing declining employing in the manufacturing industry as a whole. Moreover, growth in the industrial truck manufacturing sector has exceeded the US average and will continue to support employment and economic activity throughout the country.

Fig. 24. Summary of industrial truck manufacturers' economic impact

	Direct	Indirect	Induced	Total
Employment in (000s), income, GVA, and State & Local Taxes in billions of $				
Employment	59.7	63.9	86.1	209.6
Income	4.9	4.4	4.3	13.6
GVA	10.8	7.3	7.6	25.7
Federal, State, and Local Taxes				5.3

Source: Oxford Economics, IMPLAN

Appendix B provides a detailed summary of industrial truck manufacturing impact in each of the states.

APPENDIX A: METHODOLOGY

CREATING THE DATABASE

To conduct the impact assessment, Oxford Economics constructed a state-level database using information gathered from various sources. The primary sources of data include:

- **ITA Member Survey:** provided state-level breakdowns of employment, compensation, and company spending.
- **Proprietary Data:** used to obtain company and industry specific data.
- **Government Data:** used to estimate, distribute and control employment by state.

Use of three-pronged data approach increases accuracy in the database and mitigates chances of error and outliers in the survey responses.

Oxford Economics would like to thank the many ITA members for their support in completing detailed survey information that allowed us to complete this analysis. Many ITA member firms provided detailed state-level information regarding their operations and without this input, the analysis that follows would not have been possible.

ABOUT IMPLAN

This analysis utilized IMPLAN economic impact software. IMPLAN is an input-output modeling system used to build models at various levels of geography, including national, state, county, and congressional district. It allows for adjustable assumptions of supply-chain connections and leakages from survey input data and improved accuracy of assumptions. All data are presented in 2015 values (most recent IMPLAN model).

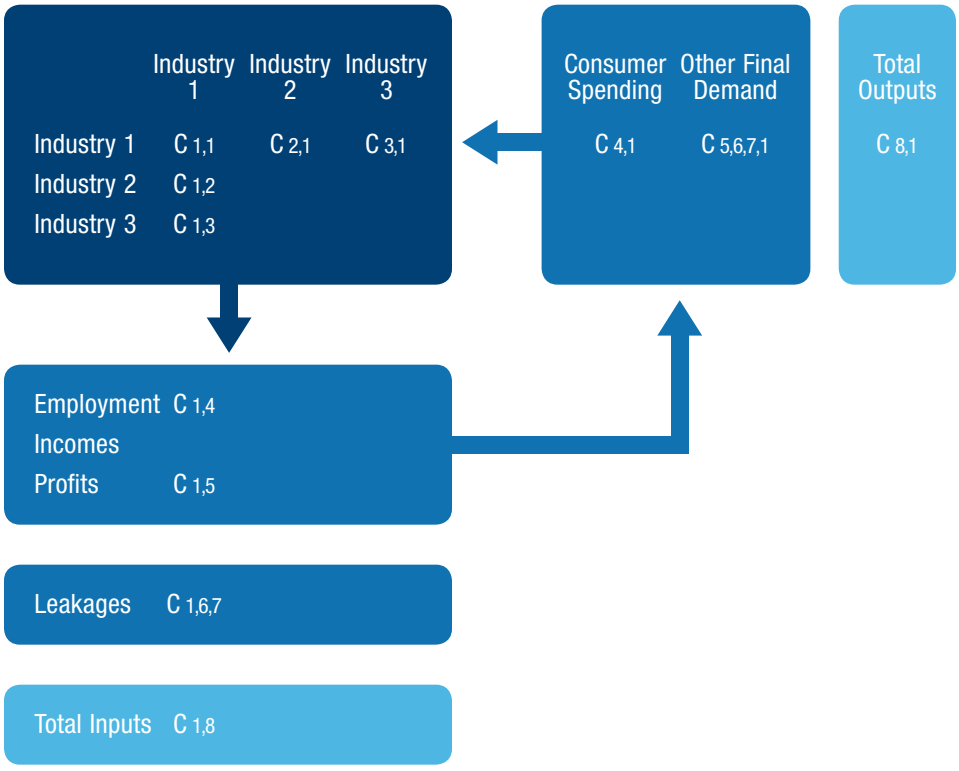
IMPLAN is widely used and recognized by government organizations, nonprofits, economic development organizations, workforce planners, education institutions, and consultants across the U.S. and Canada.

IMPACT MODEL STRUCTURE

The model is designed to capture the inter-industry relationships, consumer spending, and ripple effects that result from direct economic activity generated by forklift manufacturing and sales. The impacts are measured across four channels:

- **Direct Impact:** direct employment and spending by the industry's business operations
- **Indirect Impact:** supply-chain effects, stemming from industry's operations (e.g. legal services, utilities, etc.)
- **Induced Impact:** describes impact resulting from employees spending their incomes in state/national economy
- **Taxes:** Gross tax receipts paid at the federal, state and local level.

Input-output modeling characterizes and follows the flow of spending through an economy, thereby capturing and quantifying effects on supply chains, consumer/payroll spending, economic leakages and even government taxes. The following figure depicts the overarching structure of the model.



APPENDIX B: STATE TABLES

This table displays the full impact results for each state and the US for industrial truck manufacturers, dealers, and distributors.

Income, GVA, and State & Local Taxes in US$				
United States	**Direct**	**Indirect**	**Induced**	**Total**
Employment	59,691	63,860	86,095	209,645
Income	4,904,335,988	4,422,874,863	4,312,199,745	13,639,410,596
GVA	10,803,608,915	7,272,252,235	7,589,401,881	25,665,263,032
State and Local Taxes				2,019,226,704
Alabama	**Direct**	**Indirect**	**Induced**	**Total**
Employment	993	1,094	1,048	3,134
Income	64,109,248	66,572,377	44,255,110	174,936,735
GVA	123,289,558	117,296,789	81,238,429	321,824,777
State and Local Taxes				24,191,419
Alaska	**Direct**	**Indirect**	**Induced**	**Total**
Employment	19	39	67	125
Income	1,538,817	3,281,110	4,211,855	9,031,782
GVA	4,768,041	10,568,376	10,295,372	25,631,789
State and Local Taxes				629,276
Arizona	**Direct**	**Indirect**	**Induced**	**Total**
Employment	560	643	943	2,145
Income	51,396,139	40,457,995	44,342,963	136,197,096
GVA	97,199,047	71,980,093	77,649,958	246,829,098
State and Local Taxes				19,791,786
Arkansas	**Direct**	**Indirect**	**Induced**	**Total**
Employment	75	289	230	594
Income	6,029,253	19,389,370	11,186,669	36,605,292
GVA	17,642,838	34,081,594	20,656,656	72,381,087
State and Local Taxes				3,700,594

California	Direct	Indirect	Induced	Total
Employment	3,174	4,017	5,721	12,912
Income	238,867,566	307,694,242	320,472,571	867,034,378
GVA	526,191,403	506,940,624	580,178,443	1,613,310,470
State and Local Taxes				141,923,383
Colorado	**Direct**	**Indirect**	**Induced**	**Total**
Employment	391	517	680	1,589
Income	29,478,966	38,594,231	37,622,564	105,695,761
GVA	56,692,279	59,196,282	62,571,144	178,459,705
State and Local Taxes				13,718,310
Connecticut	**Direct**	**Indirect**	**Induced**	**Total**
Employment	238	440	570	1,248
Income	32,684,108	41,470,784	40,508,808	114,663,700
GVA	50,300,570	65,385,224	67,671,810	183,357,604
State and Local Taxes				9,995,738
Delaware	**Direct**	**Indirect**	**Induced**	**Total**
Employment	32	78	185	294
Income	13,301,186	7,033,722	11,500,239	31,835,148
GVA	55,178,693	15,914,861	26,529,604	97,623,158
State and Local Taxes				3,341,122
District of Columbia	**Direct**	**Indirect**	**Induced**	**Total**
Employment	5	98	230	334
Income	405,622	13,089,345	23,227,287	36,722,253
GVA	1,165,527	16,251,175	28,665,815	46,082,516
State and Local Taxes				1,500,187
Florida	**Direct**	**Indirect**	**Induced**	**Total**
Employment	2,140	2,414	4,018	8,571
Income	182,119,982	136,236,398	172,496,631	490,853,011
GVA	395,377,428	226,654,505	294,515,061	916,546,994
State and Local Taxes				76,792,629
Georgia	**Direct**	**Indirect**	**Induced**	**Total**
Employment	1,364	1,666	2,006	5,035
Income	93,046,525	107,751,839	94,936,765	295,735,129
GVA	199,338,517	182,001,915	176,384,584	557,725,016
State and Local Taxes				45,489,984

Hawaii	Direct	Indirect	Induced	Total
Employment	31	70	160	261
Income	1,780,020	3,571,559	6,859,795	12,211,374
GVA	7,570,829	7,259,171	12,964,680	27,794,681
State and Local Taxes				3,801,154
Idaho	**Direct**	**Indirect**	**Induced**	**Total**
Employment	180	182	213	575
Income	7,976,635	9,343,278	9,313,186	26,633,099
GVA	15,950,358	15,143,825	14,419,519	45,513,702
State and Local Taxes				4,469,501
Illinois	**Direct**	**Indirect**	**Induced**	**Total**
Employment	6,393	5,268	9,527	21,188
Income	773,148,744	389,527,005	492,266,697	1,654,942,446
GVA	1,985,067,881	642,056,057	873,839,462	3,500,963,400
State and Local Taxes				271,214,352
Indiana	**Direct**	**Indirect**	**Induced**	**Total**
Employment	3,039	3,102	3,399	9,540
Income	194,398,934	191,585,340	145,149,968	531,134,242
GVA	363,743,326	329,305,570	277,340,994	970,389,890
State and Local Taxes				68,236,476
Iowa	**Direct**	**Indirect**	**Induced**	**Total**
Employment	1,073	954	1,133	3,160
Income	72,136,428	58,809,024	49,624,211	180,569,663
GVA	160,911,306	93,991,899	92,180,863	347,084,068
State and Local Taxes				24,355,317
Kansas	**Direct**	**Indirect**	**Induced**	**Total**
Employment	708	718	784	2,209
Income	45,711,423	43,831,204	34,208,426	123,751,053
GVA	80,246,337	69,679,443	60,869,371	210,795,151
State and Local Taxes				17,263,581
Kentucky	**Direct**	**Indirect**	**Induced**	**Total**
Employment	1,557	1,398	1,555	4,509
Income	107,118,641	79,370,788	65,443,543	251,932,971
GVA	245,394,107	135,324,173	118,757,378	499,475,658
State and Local Taxes				36,054,190

Louisiana	Direct	Indirect	Induced	Total
Employment	416	446	678	1,540
Income	46,608,059	30,449,981	31,689,370	108,747,410
GVA	129,005,411	61,035,739	62,904,066	252,945,216
State and Local Taxes				13,705,411
Maine	**Direct**	**Indirect**	**Induced**	**Total**
Employment	53	85	113	250
Income	2,280,538	4,420,765	4,799,916	11,501,219
GVA	8,214,907	6,949,465	7,361,160	22,525,532
State and Local Taxes				1,975,744
Maryland	**Direct**	**Indirect**	**Induced**	**Total**
Employment	327	390	590	1,308
Income	29,789,019	26,685,060	31,502,268	87,976,346
GVA	86,363,263	42,952,943	56,020,519	185,336,725
State and Local Taxes				12,785,379
Massachusetts	**Direct**	**Indirect**	**Induced**	**Total**
Employment	558	698	1,084	2,340
Income	49,789,189	62,047,785	73,354,713	185,191,687
GVA	109,343,296	88,284,959	107,585,883	305,214,138
State and Local Taxes				15,366,943
Michigan	**Direct**	**Indirect**	**Induced**	**Total**
Employment	1,644	2,158	2,008	5,811
Income	103,267,646	153,445,739	94,946,953	351,660,338
GVA	201,738,683	247,024,261	162,811,213	611,574,157
State and Local Taxes				50,075,799
Minnesota	**Direct**	**Indirect**	**Induced**	**Total**
Employment	1,130	1,281	1,612	4,023
Income	85,586,925	98,703,876	85,579,294	269,870,095
GVA	144,922,770	153,099,679	144,822,241	442,844,691
State and Local Taxes				43,457,696
Mississippi	**Direct**	**Indirect**	**Induced**	**Total**
Employment	940	800	878	2,618
Income	61,287,634	40,276,881	31,491,816	133,056,331
GVA	124,237,664	69,891,550	60,146,149	254,275,363
State and Local Taxes				21,629,769

Missouri	Direct	Indirect	Induced	Total
Employment	1,239	1,078	1,255	3,572
Income	68,846,765	66,568,803	58,668,345	194,083,914
GVA	168,237,327	107,216,941	103,135,424	378,589,692
State and Local Taxes				25,038,443
Montana	**Direct**	**Indirect**	**Induced**	**Total**
Employment	27	63	95	185
Income	1,523,487	3,652,774	3,727,088	8,903,349
GVA	3,065,189	8,403,320	6,473,434	17,941,943
State and Local Taxes				767,866
Nebraska	**Direct**	**Indirect**	**Induced**	**Total**
Employment	595	493	595	1,683
Income	42,132,571	31,627,839	28,710,167	102,470,577
GVA	78,068,227	54,351,709	52,903,181	185,323,116
State and Local Taxes				12,724,782
Nevada	**Direct**	**Indirect**	**Induced**	**Total**
Employment	135	286	455	876
Income	12,025,970	16,464,245	19,955,749	48,445,965
GVA	42,104,654	28,988,695	36,832,200	107,925,549
State and Local Taxes				10,218,095
New Hampshire	**Direct**	**Indirect**	**Induced**	**Total**
Employment	53	156	135	344
Income	3,604,554	11,092,931	7,654,670	22,352,155
GVA	10,259,763	15,313,609	11,471,326	37,044,698
State and Local Taxes				1,770,258
New Jersey	**Direct**	**Indirect**	**Induced**	**Total**
Employment	1,136	1,214	1,726	4,076
Income	113,905,938	103,676,190	107,083,175	324,665,303
GVA	230,813,054	162,742,921	181,488,327	575,044,302
State and Local Taxes				53,370,271
New Mexico	**Direct**	**Indirect**	**Induced**	**Total**
Employment	68	100	163	331
Income	5,858,513	5,808,570	7,064,792	18,731,876
GVA	17,016,945	13,585,562	13,353,121	43,955,627
State and Local Taxes				2,168,136

New York	Direct	Indirect	Induced	Total
Employment	1,937	2,650	3,986	8,574
Income	152,058,150	263,230,455	297,774,490	713,063,095
GVA	277,643,855	404,102,461	485,036,078	1,166,782,394
State and Local Taxes				133,146,344
North Carolina	**Direct**	**Indirect**	**Induced**	**Total**
Employment	4,250	3,442	4,724	12,416
Income	286,937,051	205,444,259	204,357,628	696,738,938
GVA	738,954,325	351,214,285	388,913,375	1,479,081,985
State and Local Taxes				103,243,106
North Dakota	**Direct**	**Indirect**	**Induced**	**Total**
Employment	57	95	142	295
Income	7,683,571	6,898,105	7,533,233	22,114,909
GVA	21,679,502	13,035,045	13,144,949	47,859,496
State and Local Taxes				1,608,992
Ohio	**Direct**	**Indirect**	**Induced**	**Total**
Employment	6,297	7,069	9,499	22,865
Income	484,216,980	462,009,722	422,654,579	1,368,881,280
GVA	896,651,116	749,438,592	772,383,038	2,418,472,746
State and Local Taxes				179,295,362
Oklahoma	**Direct**	**Indirect**	**Induced**	**Total**
Employment	335	477	491	1,303
Income	26,377,190	32,972,763	25,235,042	84,584,995
GVA	55,863,321	50,710,383	40,596,268	147,169,972
State and Local Taxes				8,758,614
Oregon	**Direct**	**Indirect**	**Induced**	**Total**
Employment	1,385	1,309	1,760	4,454
Income	98,727,049	84,789,095	78,296,757	261,812,901
GVA	182,136,302	147,835,436	136,268,261	466,239,999
State and Local Taxes				37,104,099
Pennsylvania	**Direct**	**Indirect**	**Induced**	**Total**
Employment	2,146	2,416	3,380	7,941
Income	202,059,137	183,933,436	184,457,939	570,450,513
GVA	456,334,041	284,545,014	297,552,411	1,038,431,465
State and Local Taxes				75,535,375

Rhode Island	Direct	Indirect	Induced	Total
Employment	33	74	96	203
Income	2,260,945	5,620,434	5,609,154	13,490,532
GVA	5,721,648	7,894,517	8,343,131	21,959,297
State and Local Taxes				1,321,036
South Carolina	**Direct**	**Indirect**	**Induced**	**Total**
Employment	1,063	1,205	1,216	3,483
Income	75,170,102	71,136,670	48,704,751	195,011,522
GVA	166,591,627	120,919,352	91,248,382	378,759,361
State and Local Taxes				33,376,373
South Dakota	**Direct**	**Indirect**	**Induced**	**Total**
Employment	115	144	175	434
Income	7,040,898	7,938,634	8,253,884	23,233,416
GVA	11,506,362	14,400,651	15,359,543	41,266,555
State and Local Taxes				2,504,733
Tennessee	**Direct**	**Indirect**	**Induced**	**Total**
Employment	1,494	1,604	2,052	5,150
Income	122,783,375	99,294,720	102,543,584	324,621,679
GVA	270,298,378	163,027,176	165,747,403	599,072,958
State and Local Taxes				37,302,021
Texas	**Direct**	**Indirect**	**Induced**	**Total**
Employment	5,743	5,980	8,305	20,028
Income	502,175,322	442,230,613	431,316,595	1,375,722,530
GVA	1,201,677,414	745,782,000	739,299,141	2,686,758,554
State and Local Taxes				215,858,680
Utah	**Direct**	**Indirect**	**Induced**	**Total**
Employment	1,061	1,053	1,541	3,655
Income	101,205,188	59,320,532	63,567,958	224,093,678
GVA	185,576,214	99,019,054	115,846,527	400,441,794
State and Local Taxes				29,379,708
Vermont	**Direct**	**Indirect**	**Induced**	**Total**
Employment	19	43	67	129
Income	864,902	2,506,324	2,801,973	6,173,199
GVA	2,447,763	3,459,908	4,054,015	9,961,686
State and Local Taxes				717,452

Virginia	Direct	Indirect	Induced	Total
Employment	746	975	1,253	2,974
Income	82,469,650	75,978,644	67,368,102	225,816,396
GVA	167,416,585	114,012,027	119,007,800	400,436,412
State and Local Taxes				29,900,718
Washington	**Direct**	**Indirect**	**Induced**	**Total**
Employment	553	607	796	1,955
Income	36,753,561	43,446,084	44,836,725	125,036,370
GVA	100,644,393	73,020,461	85,497,709	259,162,563
State and Local Taxes				33,769,410
West Virginia	**Direct**	**Indirect**	**Induced**	**Total**
Employment	146	194	197	537
Income	10,273,065	12,646,948	8,793,125	31,713,137
GVA	34,972,212	26,617,766	16,343,278	77,933,256
State and Local Taxes				3,122,274
Wisconsin	**Direct**	**Indirect**	**Induced**	**Total**
Employment	2,004	2,227	2,495	6,726
Income	162,091,441	146,494,558	111,007,800	419,593,800
GVA	284,273,211	231,421,532	203,095,108	718,789,851
State and Local Taxes				61,143,713
Wyoming	**Direct**	**Indirect**	**Induced**	**Total**
Employment	18	59	67	144
Income	1,433,367	4,451,818	3,230,823	9,116,008
GVA	3,801,448	12,923,648	7,628,078	24,353,174
State and Local Taxes				615,104

OXFORD ECONOMICS

Europe, Middle East, and Africa:

Global headquarters
Oxford Economics Ltd
Abbey House
121 St Aldates
Oxford, OX1 1HB
UK
Tel: +44 (0)1865 268900

London
Broadwall House
21 Broadwall
London, SE1 9PL
UK
Tel: +44 (0)20 7803 1418

Belfast
Lagan House Sackville Street
Lisburn
County Down, BT27 4AB
UK
Tel: + 44 (0)2892 635400

Paarl
12 Cecilia Street
Paarl 7646
South Africa
Tel: +27(0)21 863-6200

Frankfurt
Mainzer Landstraße 41
60329 Frankfurt am Main
Germany
Tel: +49 69 95 925 280

Paris
25 rue Tiphaine
75015 Paris
France
Tel: +33 (0)1 56 53 98 52

Milan
Via Cadorna 3
20080 Albairate (MI)
Italy
Tel: +39 02 9406 1054

Americas:

New York
5 Hanover Square, 19th Floor
New York, NY 10004
USA
Tel: +1 (646) 786 1879

Philadelphia
303 West Lancaster Avenue
Suite 2e
Wayne, PA 19087
USA
Tel: +1 (610) 995 9600

Mexico City
Emerson 150, Despacho 802
Col. Polanco, Miguel Hidalgo
México D.F., C.P. 11560
Tel: +52 (55) 52503252

Boston
51 Sawyer Road
Building 2 - Suite 220
Waltham, MA 02453
USA
Tel: +1 (617) 206 6112

Chicago
980 N. Michigan Avenue,
Suite 1412 Chicago
Illinois, IL 60611
USA
Tel: +1 (773) 372-5762

Miami
1090 Oysterwood Street
Hollywood, FL 33019
USA
Tel: +1 (954) 815 0305

Asia Pacific:

Singapore
Singapore Land Tower
37th Floor
50 Raffles Place
Singapore 048623
Tel: +65 6829 7198

Sydney
Level 4, 95 Pitt Street
Sydney, 2000
Australia
Tel: +61 (0)2 8249 8286

Email:
mailbox@oxfordeconomics.com
Website:
www.oxfordeconomics.com