The Economic Impact of the Auto Care Industry, 2017

Methodology and Documentation

Prepared for

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Executive Summary

The Economic Impact of the Auto Care Industry estimates the economic contributions made by the auto care industry to the U.S. economy in 2017. John Dunham & Associates (JDA) conducted this research, which was funded by Auto Care Association. This work uses standard econometric models first developed by the U.S. Forest Service, and now maintained by the IMPLAN Group, LLC. Data comes from industry sources, government publications and Infogroup.

The study defines the auto care industry as: Automotive parts manufacturers; automotive accessories manufacturers; automotive parts distributors, jobbers, and wholesalers; automotive parts retailers; automotive specialty stores; and repair shops including independent repair shops, franchise repair shops, tire shops, oil and lube shops, auto body shops, and auto glass shops. Additionally, auto parts sales for discount department stores, warehouse stores, and other general merchandise stores are taken into account. Not included in the study are grocery stores, hardware stores, car dealerships or the repair operations in car dealerships, car washes and detailers, and car rental firms. The study measures the number of jobs in this sector, the wages paid to employees, total economic output, and federal and state business taxes generated.

Industries are linked to each other when one industry buys from another to produce its own products. Each industry in turn makes purchases from a different mix of other industries, and so on. Employees in these direct and supplier firms extend the economic impact when they spend their earnings. Thus, economic activity started by the auto care industry generates output (and jobs) in hundreds of other industries, often in sectors and states far removed from the original economic activity. The impact of supplier firms, and the "induced impact" of the re-spending by employees of industry and supplier firms, is calculated using an input/output model of the United States. The study calculates the impact on a national basis, by state, by Congressional District, by state legislative district, and by county.

The study also estimates taxes paid by the industry and its employees. Federal taxes include industry-specific excise and sales taxes, business and personal income taxes, FICA, and unemployment insurance. Direct retail taxes include state and local sales taxes, license fees, and applicable gross receipt taxes. The auto care industry pays real estate and personal property taxes, business income taxes, and other business levies that vary in each state and municipality. All entities engaged in business activity generated by the industry pay similar taxes.

The auto care industry is a dynamic part of the U.S. economy, accounting for about $1.47 trillion in total economic output or roughly 7.69 percent of GDP.[1] Parts manufacturers, product wholesalers and retailers, and repair and maintenance shops directly employ approximately 2,708,017 Americans in 2017. These workers earned over $176.26 billion in wages and benefits. When supplier and induced impacts are taken into account, the industry is responsible for 7,185,858 jobs in the United States and $443.58 billion in wages; as well as $188.64 billion in federal, state and local taxes; not including state and local sales taxes imposed on auto care parts, accessories, and service.

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1 Based on GDP of $19,027.6 billion. See: *National Income and Product Accounts Gross Domestic Product: First Quarter 2017 (Third Estimate),* News Release, US Department of Commerce, Bureau of Economic Analysis, August 9, 2017

Summary Results

The Economic Impact of the Auto Care Industry study measures the impact of the auto care industry, as defined by the manufacturing, wholesaling, retailing, and servicing of automotive parts and accessories, on the entire economy of the United States. The industry contributes about $1.47 trillion in economic output or 7.69 percent of GDP and, through its production and distribution linkages, impacts firms in all 514 sectors of the US economy.[2]

Manufacturers include companies that manufacture automotive parts and automotive accessories (e.g. chrome parts, replacement components, etc.). All told, approximately 7,404 firms employ 575,018 people in manufacturing operations, sales, packaging, and direct distribution.[3]

Once automotive products have been produced, they must be distributed to stores throughout the country by jobbers, distributors, and wholesalers. Domestic wholesalers distribute auto parts and accessories across the US that are produced here and imported products produced abroad.[4] All told, approximately 249,263 individuals are employed in the auto parts and accessories wholesaling sector of the economy.

Finally, the auto care industry includes thousands of retailers that directly sell products to the consumer, and automotive service shops that sell and install these products for the public. These include a wide range of retailers including auto supply stores, auto and truck equipment and parts retailers, general automotive repair shops, tire repair shops, auto departments in discount department stores, and various other automotive repair shops.[5] For the retail stores segment, only the percentage of employees involved in auto care parts and accessories are included. JDA estimates that there are 1.88 million people employed in the sales and service of auto care parts and accessories in retail shops and who service automobiles in independent repair shops in the United States.

Although the number of manufacturing jobs in the auto care industry has gone down since the 2015 iteration of this economic study, miles traveled by American drivers has continued to increase. According to the U.S. Department of Transportation, in July 2017 268.40 million miles were traveled by drivers. In fact, the total mileage for 2017 is estimated at 1.90 trillion, a 1.50 percent increase over 2016. As more drivers continue to log miles, the auto care industry becomes more relevant in the care and good keeping of those vehicles.[6]

Other firms are related to the auto care industry as suppliers. These firms produce and sell a broad range of items including metals, chemicals, rubber, packaging materials, machinery, plastics, and other materials needed to produce auto care parts and accessories. In addition, supplier firms provide a broad range of services, including personnel services, financial services, advertising services, consulting services or transportation services. Finally, a number of people are employed in government enterprises responsible for the regulation of the auto care industry. All told, we estimate that the auto care industry is responsible for 1.86 million supplier jobs. These firms generate about $464.49 billion in economic activity.

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2 Economic sectors based on IMPLAN sectors.

3 Throughout this study the term "firms" means facilities. One firm, such as Bridgestone might operate dozens of facilities. This portion of the study is based on facility data.

4 Based on North America Industry Classification System (NAICS) Codes 423110, 423120, 423130, 423140, 425120.

5 Based on North America Industry Classification System (NAICS) Codes 441310, 441320, 447110, 447190, 452112, 452910, 452990, 811111, 811112, 811113, 811122, 811191, 811198. Does not include automobile manufacturers and dealer franchise service shops.

6 Office of Highway Policy Information, Traffic Volume Trends, July 2017, U.S. Department of Transportation, Federal Highway Administration. Available online at https://www.fhwa.dot.gov/policyinformation/travel_monitoring/17jultvt/l

An economic analysis of the auto care industry will also take additional linkages into account. While it is inappropriate to claim that suppliers to the supplier firms are part of the industry being analyzed,[7] the spending by employees of the industry, and those of supplier firms whose jobs are directly dependent on the auto care industry, should surely be included. This spending on everything from housing, to food, to educational services and medical care makes up what is traditionally called the "induced impact" or multiplier effect of the auto care industry. In other words, this spending, and the jobs it creates are induced by the manufacturing, distribution, sale, and installation of automotive parts and accessories. We estimate that the induced impact of the industry generates $444.72 billion, and generates 2.62 million jobs, for a multiplier of 0.80.[8]

An important part of an impact analysis is the calculation of the contribution of the industry to the public finances of the community. In the case of the auto care industry, the traditional direct taxes paid by the firms and their employees provide $188.64 billion in revenues to the federal, state and local governments. These figures do not include state and local sales taxes paid on auto care goods and service purchases.

Table 1 – Economic Contribution of the Auto Care Industry

	Direct	Supplier	Induced
Jobs	2,708,017	1,860,061	2,617,780
Wages	$176,258,062,200	$129,255,710,000	$138,061,715,500
Output	$555,971,948,700	$464,485,545,200	$444,717,095,700
Taxes			$188,638,660,900

Table 1 presents a summary of the total economic impact of the industry in the United States. All told the auto care industry directly provides 1 out of every 56 people employed in the country.[9] Summary tables for each state are included in the Output Model, which is discussed in the following section.

Output Model

John Dunham & Associates produced the Economic Impact study for the Auto Care Industry Association. The analysis consists of a number of parts, each of which will be described in the following sections of this document. These include data, models, calculations and outputs. These components were pieced together into an interactive system that allows the Auto Care Association to examine the links between the various parts of the industry and to produce detailed output documents on an as-needed basis. As such, there is no book – no thick report – outlining the impact of the industry, but rather a system of models and equations that can be continuously queried and updated.

Economic Impact Modeling – Summary

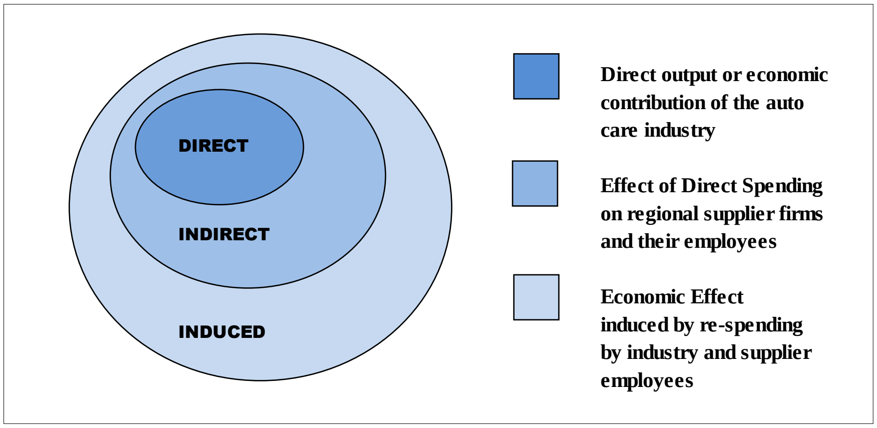
7 These firms would more appropriately be considered as part of the supplier firms industries.

8 Often economic impact studies present results with very large multipliers – as high as 4 or 5. These studies invariably include the firms supplying the supplier industries as part of the induced impact. John Dunham & Associates believes that this is not an appropriate definition of the induced impact and as such limits this calculation to only the effect of spending by direct and supplier employees.

9 Based on the labor force as of August-17. See: Table A-1. Employment status of the civilian population by sex and age, Bureau of Labor Statistics at: https://data.bls.gov/pdq/SurveyOutputServlet

The Economic Impact Study begins with an accounting of the direct employment in the domestic manufacture of auto care parts and accessories, wholesaling/importing, and retailing sectors. The data come from a variety of government and private sources.

It is sometimes mistakenly thought that initial spending accounts for all of the impact of an economic activity or a product. For example, at first glance it may appear that consumer expenditures for a product are the sum total of the impact on the local economy. However, one economic activity always leads to a ripple effect whereby other sectors and industries benefit from this initial spending. This inter-industry effect of an economic activity can be assessed using multipliers from regional input-output modeling.



The economic activities of events are linked to other industries in the state and national economies. The activities required to manufacture auto parts and accessories generate the direct effects on the economy. Regional (or indirect) impacts occur when these activities require purchases of goods and services such as sheet metal or electricity from local or regional suppliers. Additional induced impacts occur when workers involved in direct and indirect activities spend their wages. The ratio between induced jobs and direct jobs is termed the multiplier.

This method of analysis allows the impact of local production activities to be quantified in terms of final demand, earnings, and employment in the states and the nation as a whole.

Once the direct impact of the industry has been calculated, the input-output methodology discussed below is used to calculate the contribution of the supplier sector and of the re-spending in the economy by employees in the industry and its suppliers. This induced impact is the most controversial part of economic impact studies and is often quite inflated. In the case of the Auto Care Association model, only the most conservative estimate of the induced impact has been used.

Model Description and Data

This analysis is based on data provided by Infogroup, the Auto Care Association and the federal government. The analysis utilizes the IMPLAN Group, LLC model in order to quantify the economic impact of the auto care industry on the economy of the United States.[10] The model adopts an accounting framework through which the relationships between different inputs and outputs across industries and sectors are computed. This model can show the impact of a given economic decision – such as a factory opening or operating a sports facility – on a pre-defined, geographic region. It is based on the national income accounts generated by the US Department of Commerce, Bureau of Economic Analysis (BEA).[11]

10 The model uses 2014 input/output accounts.

11 RIMS II is a product developed by the U.S. Department of Commerce, Bureau of Economic Analysis as a policy and economic decision analysis tool. IMPLAN was originally developed by the US Forest Service, the Federal Emergency Management Agency and the Bureau of Land Management. It was converted to a user-friendly model by the Minnesota IMPLAN Group (now IMPLAN Group, LLC) in 1993.

Every economic impact analysis begins with a description of the industry being examined. In the case of the Auto Care Association model, the auto care industry is defined as the manufacturing, importation/wholesaling, retailing, and servicing of a wide range of automotive parts and accessories, including replacement parts, accessories, lubricants, appearance products, tires, collision repairs as well as the tools and equipment necessary to make the repair.[12]

The IMPLAN Group model is designed to run based on the input of specific direct economic factors. It uses a detailed methodology (see IMPLAN Methodology section) to generate estimates of the other direct impacts, tax impacts and supplier and induced impacts based on these entries. In the case of the Economic Impact of the Auto Care Industry, direct employment in the auto care industry is a base starting point for the analysis. Direct employment is based directly on data provided to John Dunham & Associates by Infogroup as of August 2017; and from member data provided by the Auto Care Association.[13] This data is gathered at the facility level; therefore, a company with a manufacturing plant, warehouse and sales office would have three facilities, each with separate employment counts. Since the Infogroup data are adjusted on a continual basis, staff from John Dunham & Associates scanned the data for discrepancies. The data from Infogroup was then merged with member data provided by the Auto Care Association. In addition, for cases where employment data for Auto Care Association member firms were available, Infogroup employment figures were replaced with those from Auto Care Association.

Data on the retail and wholesale sectors are all based on employment in each of the retail and wholesale areas (jobbers, distributors, wholesalers, auto parts stores, auto service centers, etc.) obtained from Infogroup. In order to estimate total employment in the auto care retail sector, the total employment at each store type is multiplied by the percent of total sales comprised of automotive parts, accessories, and labor charges. The percentage of sales is derived from data maintained by the US Department of Commerce, Bureau of the Census.[14] Likewise, the percentage of wholesale output that is attributed to auto parts distribution is applied to wholesaler employment to determine the number of these employees supported by the auto care market.[15]

Once the initial direct employment figures have been established, they are entered into a model linked to the IMPLAN database. The IMPLAN data are used to generate estimates of direct wages and output. Wages are derived from data from the U.S. Department of Labor's ES-202 reports that are used by IMPLAN to provide annual average wage and salary establishment counts, employment counts and payrolls at the county level. Since this data only covers payroll employees, it is modified to add information on independent workers, agricultural employees, construction workers, and certain government employees. Data are then adjusted to account for counties where non-disclosure rules apply. Wage data include not only cash wages, but health and life insurance payments, retirement payments and other non-cash compensation. It includes all income paid to workers by employers.

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12 Excluded from the study are the manufacturing, wholesaling, and retailing of automobiles, as well as repair operations in dealer franchise shops.

13 Infogroup, is the leading provider of business and consumer data for the top search engines and leading in-car navigation systems in North America. Infogroup gathers data from a variety of sources by sourcing, refining, matching, appending, filtering, and delivering the best quality data. The company verifies its data at the rate of almost 100,000 phone calls per day to ensure absolute accuracy.

14 Labor charges not included for warehouse clubs, discount department stores, and general merchandise stores. See: 2012 Economic Census, *Retail Trade: Industry Series: Preliminary Product Lines Statistics by Industry for the U.S.: 2012,* September 30, 2017, US Department of Commerce, Bureau of the Census, at: http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t

15 2012 Economic Census, *Wholesale Trade: Industry Series: Preliminary Product Lines Statistics by Kind of Business for the U.S.: 2012,* September 30, 2017, US Department of Commerce, Bureau of the Census, at: http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t

Total output is the value of production by industry in a given state. It is estimated by IMPLAN from sources similar to those used by the BEA in its RIMS II series. Where no Census or government surveys are available, IMPLAN uses models such as the Bureau of Labor Statistics' growth model to estimate the missing output.

The model also includes information on income received by the Federal, state and local governments, and produces estimates for the following taxes at the Federal level: Corporate income; payroll, personal income, estate and gift, and excise taxes, customs duties; and fines, fees, etc. State and local tax revenues include estimates of: Corporate profits, property, sales, severance, estate and gift and personal income taxes; licenses and fees and certain payroll taxes.

While IMPLAN is used to calculate the state level impacts, Infogroup data provide the basis for district and county level estimates. Publicly available data at the county and district level is limited by disclosure restrictions, especially for smaller sectors of the economy. The model therefore uses actual physical location data provided by Infogroup in order to allocate jobs – and the resulting economic activity – by physical address or when that is not available, zip code. For zip codes entirely contained in a single district, jobs are allocated based on the percentage of total sector jobs in each zip code. For zip codes that are broken by districts, allocations are based on the percentage of total jobs physically located in each segment of the zip code. Physical locations are based on either actual address of the facility, or the zip code of the facility, with facilities placed randomly throughout the zip code area. All supplier and indirect jobs are allocated based on the percentage of a state's employment in that sector in each of the districts. Again, these percentages are based on Infogroup data.

IMPLAN Methodology[16]

Francois Quesnay one of the fathers of modern economics, first developed the analytical concept of inter-industry relationships in 1758. The concept was actualized into input-output analysis by Wassily Leontief during the Second World War, an accomplishment for which he received the 1973 Nobel Prize in Economics.

Input-Output analysis is an econometric technique used to examine the relationships within an economy.

It captures all monetary market transactions for consumption in a given period and for a specific geography. The IMPLAN model uses data from many different sources – as published government data series, unpublished data, sets of relationships, ratios, or as estimates. The IMPLAN Group, LLC gathers this data, converts it into a consistent format, and estimates the missing components.

There are three different levels of data generally available in the United States: Federal, state and county.

Most of the detailed data is available at the county level, and as such there are many issues with disclosure, especially in the case of smaller industries. IMPLAN overcomes these disclosure problems by combining a large number of datasets and by estimating those variables that are not found from any of them. The data is then converted into national input-output matrices (Use, Make, By-products, Absorption and Market Shares) as well as national tables for deflators, regional purchase coefficients and margins.

The IMPLAN Make matrix represents the production of commodities by industry. The Bureau of Economic Analysis (BEA) Benchmark I/O Study of the US Make Table forms the bases of the IMPLAN model. The Benchmark Make Table is updated to current year prices, and rearranged into the IMPLAN sector format. The IMPLAN Use matrix is based on estimates of final demand, value-added by sector and

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16 This section is paraphrased from IMPLAN Professional: Users Guide, Analysis Guide, Data Guide, Version 2.0, MIG, Inc., June 2000.

total industry and commodity output data as provided by government statistics or estimated by IMPLAN. The BEA Benchmark Use Table is then bridged to the IMPLAN sectors. Once the re-sectoring is complete, the Use Tables can be updated based on the other data and model calculations of interstate and international trade.

In the IMPLAN model, as with any input-output framework, all expenditures are in terms of producer prices. This allocates all expenditures to the industries that produce goods and services. As a result, all data not received in producer prices is converted using margins which are derived from the BEA Input-Output model. Margins represent the difference between producer and consumer prices. As such, the margins for any good add to one. If, for example, 10 percent of the consumer price of auto parts is from the purchase of aluminum, then the aluminum margin would be 0.1.

Deflators, which account for relative price changes during different time periods, are derived from the Bureau of Labor Statistics (BLS) Growth Model. The 224 sector BLS model is mapped to the 536 sectors of the IMPLAN model. Where data are missing, deflators from BEA's Survey of Current Businesses are used.

Finally, the Regional Purchase Coefficients (RPCs) – essential to the IMPLAN model – must be derived. IMPLAN is derived from a national model, which represents the "average" condition for a particular industry. Since national production functions do not necessarily represent particular regional differences, adjustments need to be made. Regional trade flows are estimated based on the Multi-Regional Input-Output Accounts, a cross-sectional database with consistent cross interstate trade flows developed in 1977. These data are updated and bridged to the 536 sector IMPLAN model.

Once the databases and matrices are created, they go through an extensive validation process. IMPLAN builds separate state and county models and evaluates them, checking to ensure that no ratios are outside of recognized bounds. The final datasets and matrices are not released before extensive testing takes place.