

Contribution of Toyota Motor North America to the Economies of Nineteen States and the United States in 2015



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ACKNOWLEDGEMENTS

This study is the result of a group effort. The authors would like to thank our colleagues at the Center for Automotive Research, Terni Fiorelli, and our former colleague, Deb Menk, for their assistance with this study. Additional assistance was provided by Diana Douglass, who coordinated the production of this document.

Also, we would like to thank Toyota Motor North America, Inc. for the opportunity to carry out this research.

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The Center for Automotive Research, a nonprofit automotive research center, has performed detailed studies of the contribution of the automotive industry and its value chain in the U.S. economy for more than 35 years.

CAR's mission is to conduct independent research and analysis to educate, inform and advise stakeholders, policy makers, and the general public on critical issues facing the automotive industry, and the industry's impact on the U.S. economy and society.

EXECUTIVE SUMMARY

This study estimates the employment and economic contribution of Toyota Motor North America's operations and activities to the United States economy, and the economies of the nineteen states in which Toyota has significant manufacturing or other operations in 2015. The Center for Automotive Research (CAR) used a regional model of the U.S. and state economies to estimate that Toyota's 135,900 direct employees in manufacturing, supporting operations, and dealerships generate another 108,400 jobs in companies that supply Toyota (intermediate impacts), and 225,800 jobs that are supported by the direct and indirect employees spending their paychecks in the economy (spin-off or expenditure-induced impacts)—for a total employment impact of 470,100. These results yield an employment multiplier of 3.5 for Toyota's overall U.S. operations. Toyota's U.S. employment also supports \$32.3 billion in private non-farm payroll income, which is \$23.6 billion after taxes, social insurance payments, and government transfer receipts. Toyota's estimated employment contribution totals 0.29 percent of total U.S. private economy employment, and 0.35 percent of total U.S. private compensation—which means that Toyota employees are higher paid on average in the context of the overall U.S. economy.

Focusing solely on Toyota Motor North America's U.S. manufacturing-related operations, Toyota's 30,700 direct U.S. jobs generate another 62,800 supplier jobs, and 124,200 spin-off jobs—for a total manufacturing-related employment impact of 217,700 jobs in the United States. Based on the company's manufacturing results alone, Toyota's employment multiplier is 7.1—which means that there are an additional 6.1 jobs in the U.S. economy that are supported by every one employee in Toyota's U.S. manufacturing-related operations. Nearly half of the total Toyota U.S. payroll and personal disposable income contribution is generated by manufacturing-related operations—with the remainder comprised of new vehicle dealerships and manufacturing-support operations which include research and development, engineering, and technical centers.

CAR's estimates confirm that Toyota Motor North America makes significant economic contributions to the U.S. economy, as well as to the economies of the states in which Toyota's major operations are located. Toyota builds 70 percent of the vehicles it sells in the United States in this country. Toyota's commitment to the United States is also demonstrated in the company's investments in U.S. plants, equipment and facilities, and its corporate operations, as well as its corporate philanthropic giving. Over the past 20 years, two out of every three dollars Toyota has invested in North America have been spent on U.S. facilities, and the company's charitable giving totals \$700 million to U.S. non-profit organizations.

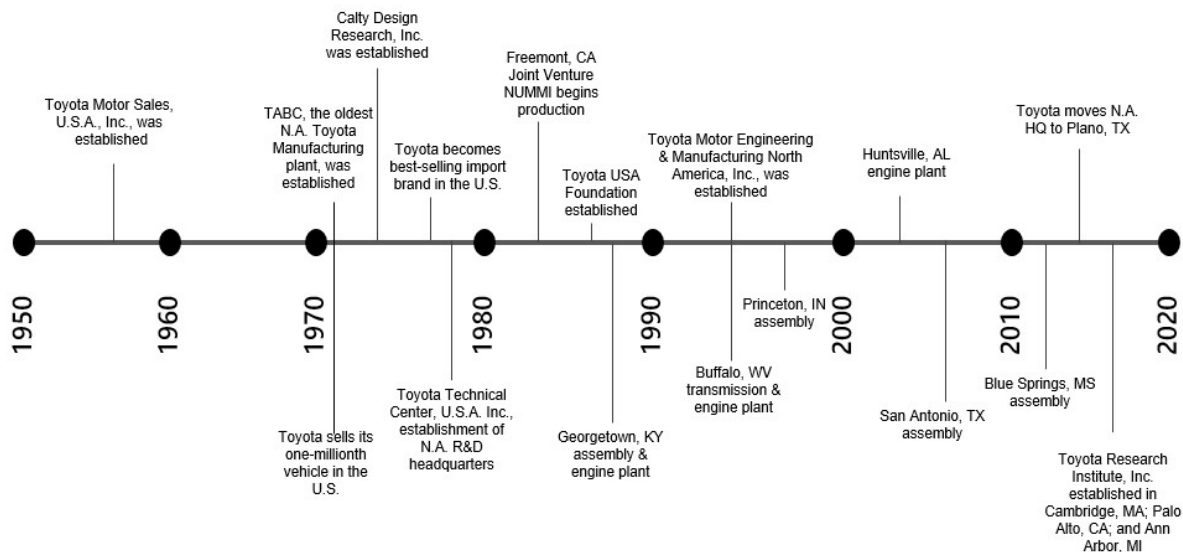
This report is presented in four sections: first is a presentation of Toyota's history in the United States and overview of the company's U.S. operations and activities; second is a review of CAR's estimates of the economic contribution of those operations and activities to the United States economy—as well as to the economies of the nineteen states included in this analysis; the third section contains concluding remarks; and finally, the fourth section is an appendix that includes a section on detailed research methodology, complete tables of the industry breakdown of intermediate and spin-off employment supported by Toyota's direct employment, a comparison of current results to previous Toyota economic contribution study estimates produced by CAR, and the bibliography.

SECTION I: A BRIEF HISTORY OF TOYOTA IN THE UNITED STATES

Toyota's presence in the United States began when Toyota Motor Sales, U.S.A., Inc. was established in 1957, with its headquarters based in Torrance, California (Toyota Motors Sales, U.S.A., Inc., 2012). In 1958, which was the automaker's first sales year, just a few hundred vehicles were sold. Within a decade, however, Toyota was selling over 20,000 vehicles a year, and was ranked the third best-selling import brand in the United States, and by 1975, Toyota was the top selling import brand in the nation.

Toyota began producing vehicles in the United States in 1986 when it opened the New United Motor Manufacturing, Inc. (NUMMI) plant, a joint venture with General Motors (Toyota Motors Sales, U.S.A., Inc., 2012). Though NUMMI ceased operations in 2010, Toyota continues to produce vehicles in four vehicle assembly plants in the United States, two in Canada, and currently, one in Mexico. In addition, a new plant was announced for Mexico in 2015; this plant is expected to begin operations in Guanajuato, Mexico by 2019 and is projected to employ approximately 2,000 workers. Figure 1 depicts a timeline outlining Toyota's administration and manufacturing milestones and growth throughout the years.

Figure 1: A Timeline of Toyota Operations in the United States, 1957-2016



Source: Toyota

Over time, Toyota has expanded its U.S. product offerings with the additions of Lexus and Scion brands, and has added to its production capacity with new engine and assembly plants across the continent. The company decided to absorb and dissolve Scion in 2016, since newer Toyota-branded models were fulfilling the market niche for younger buyers (Durbin, 2016). Not only has Toyota made several changes to its production facilities but in 2015, the company announced that they would be consolidating their North American operations to Plano, Texas.

Toyota U.S. Sales

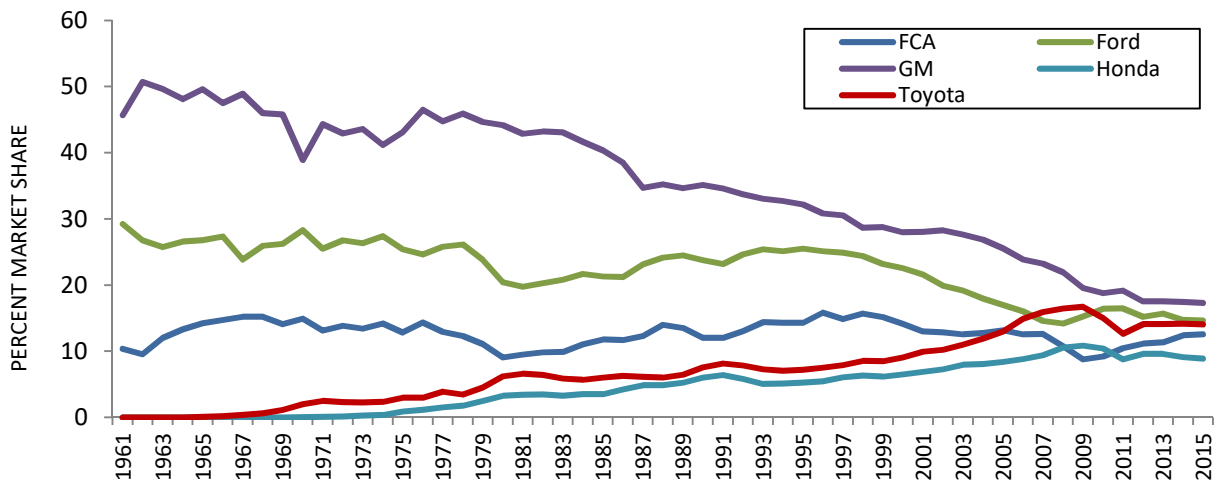
Toyota's U.S. sales have risen steadily since the company entered the U.S. market in 1958. Figure 2 shows the growth of Toyota's U.S. light vehicle sales through 2015. By the mid 1980's, sales surpassed the million-unit mark, and Toyota's U.S. sales exceeded 2.5 million units in 2015. Toyota was the third-best selling automaker in the United States in 2015 with 14.3 percent of the market—behind only Ford Motor Company and General Motors, as shown in Figure 3.

Figure 2: Toyota Total Light Vehicle Sales in the U.S., 1961-2015



Source: Ward's Auto Data

Figure 3: U.S. Total Vehicle Sales Market Share by Company, 1961-2015

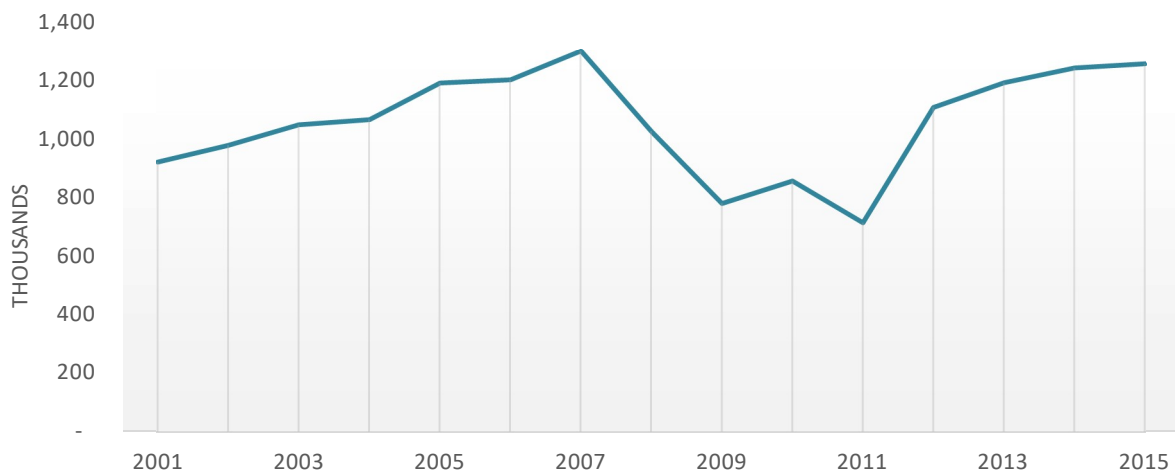


Source: Ward's Auto Data

Toyota U.S. Vehicle, Engine, and Transmission Production

Toyota cars and light trucks are currently assembled in four plants across the United States. The company also builds engines in three plants, and transmissions in a single, dedicated transmission plant—some of these powertrain operations are co-located with an assembly facility. Toyota produced 1.3 million motor vehicles in 2015 in its U.S. light vehicle assembly plants, making the company the fifth largest vehicle producer in the United States. Figure 4 shows Toyota’s U.S. production rose rapidly through 2007, when all U.S. production declined during the recession. Toyota’s U.S. production has since recovered to pre-recession levels.

Figure 4: Toyota U.S. Vehicle Production, 2001-2015



Sources: Ward’s Auto and LMC Automotive

Toyota’s vehicle assembly plants are located in Kentucky, Indiana, Texas, and Mississippi. The vehicles produced in the United States include the Camry, Avalon, Venza, Sequoia, Highlander, Sienna, Tundra, Tacoma, Lexus ES 350, and the Corolla.

Figure 5: Toyota U.S. Manufacturing Locations, 2016

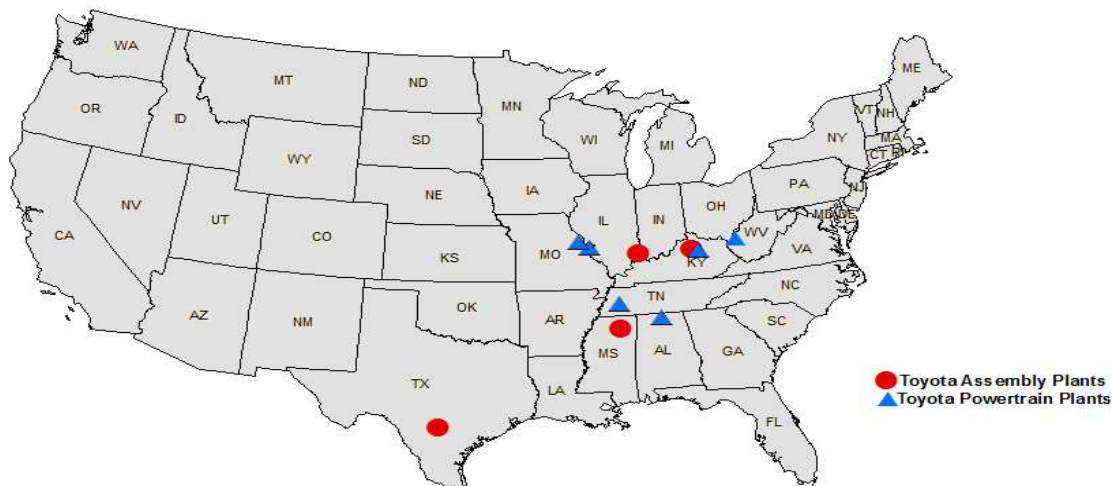


Table 1 depicts the locations of Toyota’s light vehicle assembly operations in the United States, and includes a description of what is produced at each location and the plants’ 2015 production volumes.

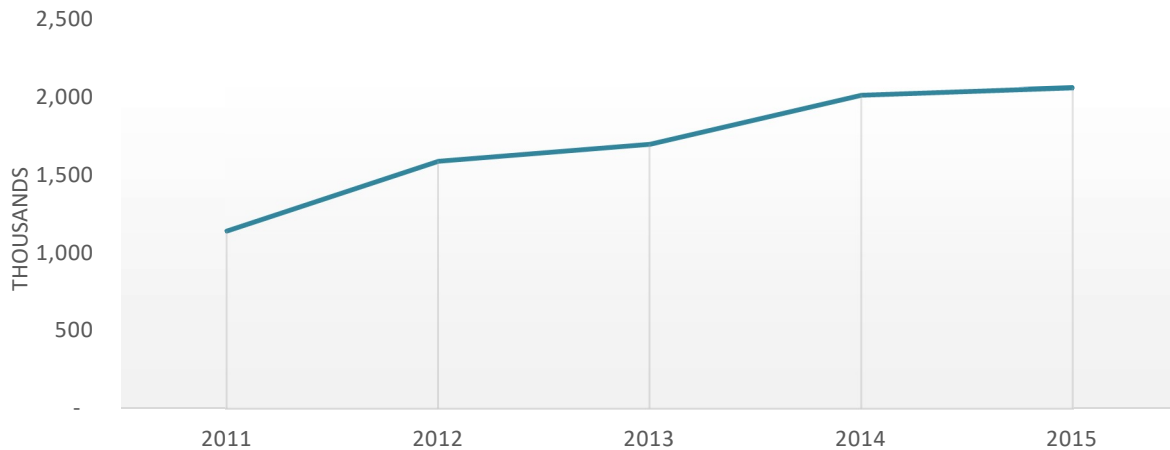
Table 1: Toyota Manufacturing Plants in the United States, 2015

Plant	Facility Location	Products	2015 Production
Toyota Motor Manufacturing, Kentucky, Inc. (TMMK)	Georgetown, KY	Camry, Camry Hybrid, Avalon, Avalon Hybrid, Venza, Lexus ES 350	457,668
Toyota Motor Manufacturing, Indiana, Inc. (TMMI)	Princeton, IN	Sequoia, Highlander, Sienna	375,647
Toyota Motor Manufacturing, Texas, Inc. (TMMTX)	San Antonio, TX	Tundra, Tacoma	232,910
Toyota Motor Manufacturing, Mississippi, Inc. (TMMMS)	Blue Springs, MS	Corolla	190,514
Toyota Motor Manufacturing, West Virginia, Inc. (TMMVW)	Buffalo, WV	4-cylinder & V6 engines, and 5-6- and 8-speed transmissions	697,755 engines 537,594 transmissions
Toyota Motor Manufacturing Alabama, Inc. (TMMAL)	Huntsville, AL	4-cylinder, V6 & V8 engines	731,539
Toyota Motor Manufacturing, Kentucky, Inc. (TMMK)	Georgetown, KY	4-cylinder & V6 engines	570,830
Bodine Aluminum, Inc.	St. Louis, MO	Engine brackets and carrier covers	
Bodine Aluminum, Inc.	Troy, MO	Engine brackets and carrier covers, cylinder heads and cylinder blocks	
Bodine Aluminum, Inc.	Jackson, TN	aluminum cylinder blocks and automatic transmission parts	

Source: Toyota, Ward’s Automotive Data, LMC Automotive

Toyota’s United States engine plants are located in Alabama, Kentucky, and West Virginia. The capacity of these is roughly two million engines annually. Figure 6 shows Toyota’s United States engine production from 2011 through 2015. Toyota produced over two million engines in the United States in 2015, making it the fourth largest engine producer that year. Given that Toyota produced only 1.3 million vehicles in the U.S. during the same year, Toyota was a net exporter of its U.S.-produced engines in 2015.

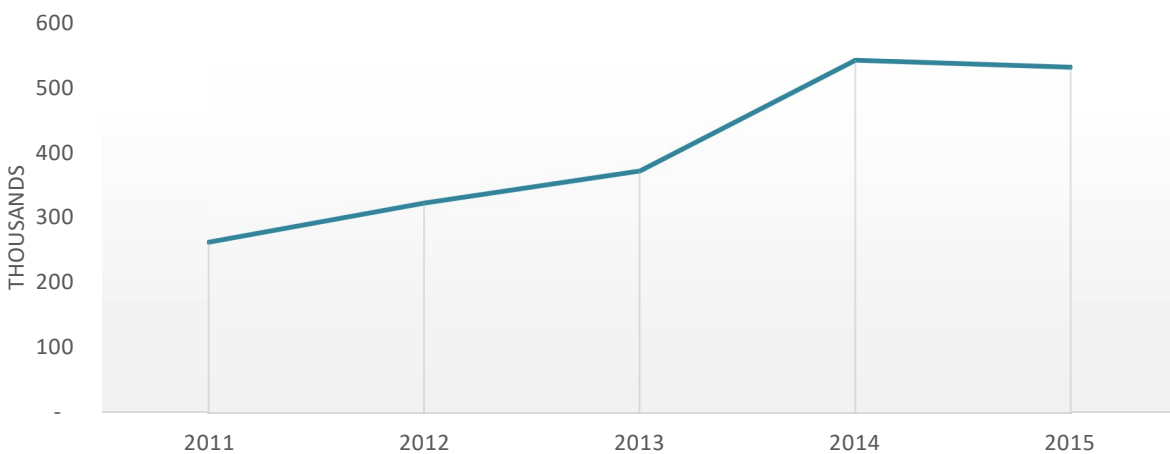
Figure 6: Toyota U.S. Engine Production, 2011-2015



Source: LMC Automotive

Figure 7 provides a history of Toyota U.S. transmission production from 2011 through 2015. Toyota Motor Manufacturing, West Virginia, Inc. is Toyota's sole U.S. transmission facility, and the plant has produced transmissions at an annual volume exceeding a half million units in each of the last two years.

Figure 7: Toyota U.S. Transmission Production, 2011-2015

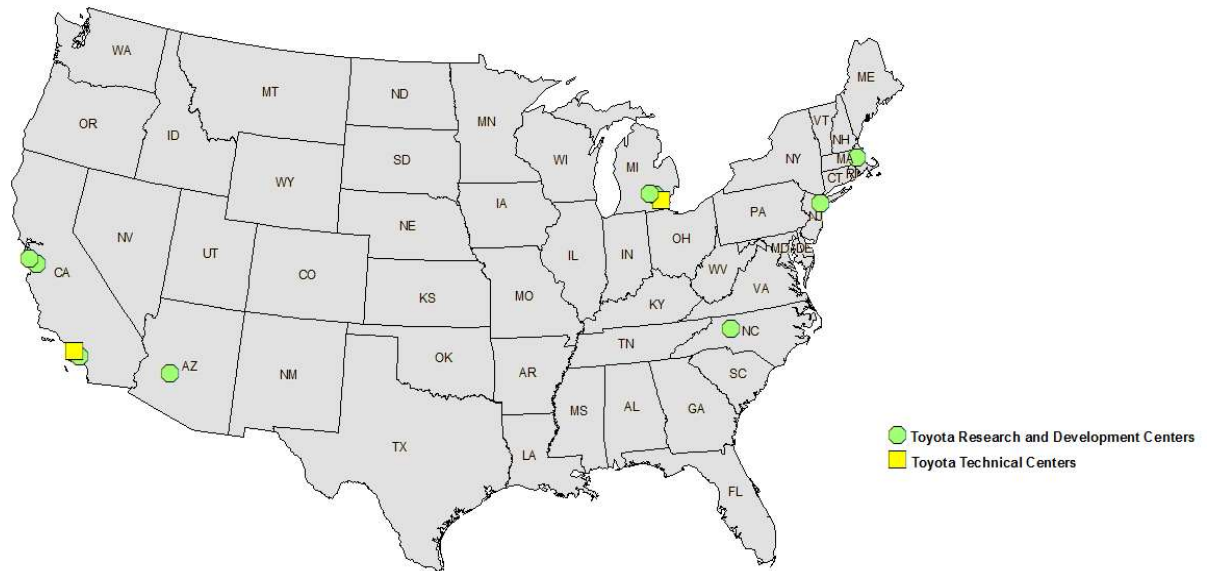


Source: LMC Automotive

Toyota U.S. Research, Development, and Technical Centers

Toyota's operations in the United States also include a number of research and development facilities located in Michigan, Massachusetts, California, Arizona, and Washington, D.C. These facilities house groups that include vehicle design, product planning, basic research, and vehicle engineering and evaluation.

Figure 8: Toyota U.S. Research, Development, and Technical Center Locations, 2016



In November 2015, Toyota announced a \$1 billion investment to establish the Toyota Research Institute (TRI) in the United States. In addition, Toyota pledged \$50 million towards creating research labs near the TRI locations (Greimel, 2015). The Toyota Research Institute locations in Cambridge, Massachusetts and Palo Alto, California work closely with the Massachusetts Institute of Technology and Stanford University. In April 2016, Toyota selected Ann Arbor, Michigan to be the home of its third TRI, joining the Palo Alto and Cambridge locations. The new center will be near the University of Michigan campus, where it will specialize in research in materials science, robotics, and artificial intelligence. The three TRI facilities are each meant to have a broad focus: the Ann Arbor TRI will focus primarily on fully autonomous driving; the Palo Alto location is focusing on partially-autonomous driver assist programs, and the Cambridge TRI is focused on simulation and deep learning (Muller, 2016).

Table 2 details the location and areas of focus for each of Toyota’s North American research and development groups.

Table 2: Toyota Research, Development, and Technical Centers, 2016

Facility Name	Focus	Location
Arizona Proving Ground	Vehicle Test Track	Wittmann, AZ
Calty Design Research	Vehicle Design Center	Ann Arbor, MI
Calty Design Research	Vehicle Design Center	Newport Beach, CA
Toyota Info Technology Center	Technology Research and Development Center	Mountain View, CA
Toyota Info Technology Center	Technology Research and Development Center	New York City, NY
Toyota Research Institute	Autonomous Driving Research Institute	Ann Arbor, MI
Toyota Research Institute	Simulation and Deep Learning Research Institute	Cambridge, MA
Toyota Research Institute	Semi-Autonomous Driving Research Institute	Palo Alto, CA
Toyota Technical Center	Engineering Design and Development Center	Gardena, CA
Toyota Technical Center	Engineering, Research and Development Headquarters	Saline, MI
TRD, U.S.A., Inc.	Race vehicle engineering and trackside technical service to support Toyota’s NHRA and NASCAR programs	Salisbury, NC

Source: Toyota, Automotive News

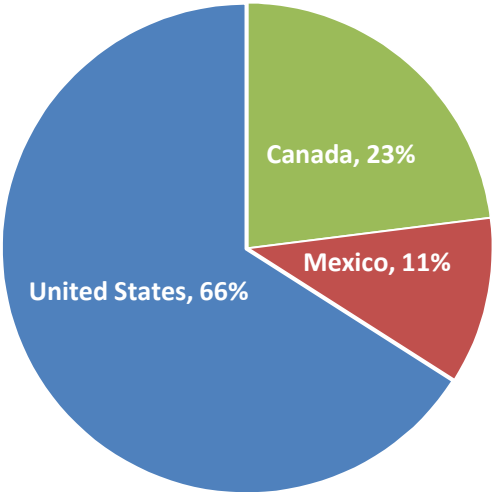
Toyota Dealerships

Toyota has nearly 1,500 new vehicle dealerships located throughout the United States, and these businesses employ 97,100 in their new vehicle sales and service operations. Roughly 70 percent of all vehicles Toyota sells in the United States were assembled in the company’s U.S. manufacturing plants.

Toyota’s U.S. Investment Trends

Since 1996, Toyota has announced over \$10.8 billion of investments into its North American operations, this includes; 20 investments for new facilities, 36 investments for expansion, and 8 investments to retool existing facilities. With many automakers beginning to open manufacturing operations in Mexico, investment in the country has risen to unprecedented levels. However, over the last two decades, Toyota has invested the majority of this \$10.8 billion total in the United States. Figure 9 shows the distribution of Toyota’s North American investments in the United States, Canada, and Mexico between 1996 and 2016.

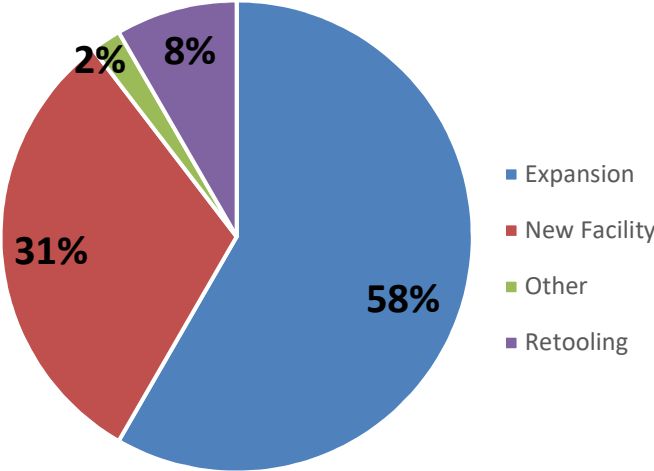
Figure 9: Toyota Facility Investments, Percentage of North America by Country, 1996-2016



Source: Center for Automotive Research Book of Deals

Figure 10 provides a visual breakdown of Toyota’s \$7.1 billion investment in U.S. operations over the past 20 years.

Figure 10: Percent of Toyota Investments in the United States by Type, 1996-2016

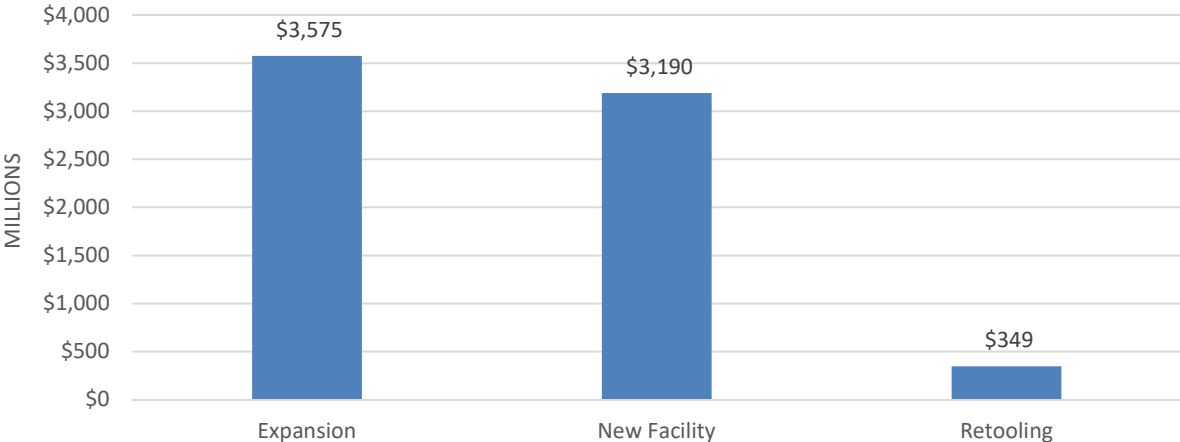


Source: Center for Automotive Research Book of Deals

Other notable Toyota investment announcements include a \$126 million expansion of the Toyota Technical Center in Ann Arbor, Michigan (announced December 2014), and a \$100 million expansion of its assembly plant in Princeton, Indiana to boost production of the Toyota Highlander (announced August 2014). The Princeton expansion was projected to create 300 jobs at the Indiana plant.

Figure 11 shows Toyota’s investments in expanding facilities, building new facilities, and retooling existing facilities over the past 20 years.

Figure 11: Known Toyota Investments in the United States by Type, 1996-2016



Source: Center for Automotive Research Book of Deals

Environmental Sustainability

As a company, Toyota has set a goal to minimize their environmental impact and promote positive environmental change. The company plans to reduce the carbon footprint of their vehicles and company operations, conserve and protect water sources, improve recycling and reuse opportunities, improve biodiversity on and near Toyota facilities, and promote and enhance dealer environmental initiatives. The company released an environmental report in 2015 that details each of its environmental sustainability goals, which are summarized in Table 3.

Table 3: Toyota North American Environmental Action Plan

	Objective	Progress
Carbon	Reduce the carbon footprint of vehicles and operations by expanding Toyota’s hybrid line-up in North America	On Track: Launched the 2015 Lexus NX 300h; announced the 2016 RAV4 Hybrid
	Reduce energy consumption per new vehicle produced by 12%, compared to FY2010 vehicles	Target Exceeded: Reduced energy use 16.6%
	Reduce GHG emissions per new vehicle produced by 12%, compared to FY2010 vehicles	Target Exceeded: Reduced GHGs by 16%
Water	Conserve water and protect water sources by reducing water withdrawal by 6% per vehicle produced by FY 2016, compared to FY2010 vehicles	Target Exceeded: Reduced water withdrawal per vehicle by 8%
Materials	Eliminate waste and improve recycling and reuse opportunities	On Track: Developing a new target for waste by defining the 3R rate, and completed data collection for all North American-produced vehicles
Biodiversity	Improve biodiversity on and near Toyota facilities by achieving Wildlife Habitat Council certification at 9 sites by the end of 2016	Target Achieved: 9 sites were certified
Dealerships	Promote and enhance dealer environmental incentives by having 53 dealerships by LEED certified	On Track: 47 dealerships have been certified so far

Source: Toyota North American Environmental Report 2015

In addition to Toyota’s green corporate initiatives, the company is committed to producing vehicles that use advanced technologies to reduce the environmental impact of driving—such as the Mirai, launched in 2016. The Mirai is a hydrogen fuel-cell vehicle, which combines hydrogen and oxygen to generate electricity while emitting only water vapor. The Mirai is only available in certain U.S. markets, but the vehicle was named the 2016 World Green Car at the New York International Auto Show. Toyota is not new to the World Car Awards Program. The Toyota Prius 2010 earned ‘Top Three in the World’ status in both the World Green Car and the overall World Car of the Year categories. The Toyota Harrier Hybrid was a finalist for the title of World Green Car in 2006.

Toyota has also been a leader in both developing new vehicle technologies and in bringing them to market at high volumes. Thanks in large part to its Prius family of products, which include hybrid and

plug-in powertrain options, Toyota has sold more than 9 million hybrid vehicles since the Prius debuted in 1997.

Philanthropy

To date, Toyota has donated over \$700 million to non-profit organizations in the United States—including \$69 million in 2015 alone. In general, Toyota’s philanthropic efforts are divided into three main areas of focus: conservation, education outreach, and safety incentives.

- **Conservation:** Toyota’s goals of conservationism are met through organizations such as Toyota TogetherGreen, which was founded in 2008 with the aim to engage citizens in conservation efforts across the United States. TogetherGreen has three major components. First, LeadGreen is a conservation fellowship program to recognize diverse individuals who have the potential to become environmental leaders and help them to become role models in the community. Second, GrowGreen allots innovation grants to support creative projects that contribute to significant gains in conservation efforts and engage diverse communities. Third, GoGreen organizes volunteer projects at sites across the United States to start a dialogue about real conservation impact in diverse communities (Toyota Motor North America, Inc., 2016).
- **Education:** Toyota’s philanthropic efforts in education advancement are met by the Toyota USA Foundation, which has awarded more than \$52 million to non-profit organizations in the United States since 1987. The organizations supported by the Foundation share a common goal of enhancing the quality of education by supporting innovative programs and building partnerships with organizations that are dedicated to improving the teaching and learning of science, technology, engineering, and mathematics (Toyota Motors North America, Inc., 2016). The Toyota USA Foundation funds these programs through a grant system. Examples of these grants include a \$750,000 grant to The Johns Hopkins University Center for Talented Youth to expand opportunities for academically talented, low-income students in STEM fields, and a \$210,000 grant to the Red Cloud Indian School on the Pine Ridge Reservation in South Dakota to enhance the science education of Lakota students to help them compete and succeed in scientific fields (Toyota Motors North America, Inc., 2016).
- **Safety:** In order to advance safety education and outreach, Toyota has partnered with groups like AARP, the National Safety Council, Students Against Destructive Decisions, and Discovery Education to create programs that both provide vehicle safety education, and also donates resources to make people safer in their vehicles. An example of these efforts is the Buckle Up for Life program, a joint-effort of the Cincinnati Children’s Hospital and Toyota which was established in 2004 to educate entire families on critical safety behaviors and provide free child car seats to families in need. The program originated in Cincinnati, but with Toyota’s funding has expanded; Buckle Up for Life now operates in 14 cities including Chicago, Houston, Boston, New York, and Los Angeles. Since its establishment, the Buckle Up for Life program has nearly tripled the number of children buckled up among families participating in one pilot city. To date, the group has donated over 40,000 car seats to families in need (Buckle Up for Life, 2013).

Diversity Efforts

Toyota's philosophy is that "a diverse and inclusive workforce brings a broad spectrum of ideas and voices to our company that enriches every product we create." Toyota aims to actively encourage respect, trust, and understanding among their employees with the hope of better serving their company, customers, and community. These efforts have been recognized by numerous outside organizations. The most recent diversity award was given in November 2015 at the 59th annual Equal Opportunity Dinner (EOD), where Toyota was honored for being at the forefront of empowering underserved communities and its dedication to corporate diversity (Toyota Motor North America, Inc., 2015).

In addition to the 2015 EOD award, Toyota was the only automaker named in Diversity Inc.'s "Top 50 Companies for Diversity" in 2015. According to a press release from Toyota, "The Diversity Inc. list recognizes businesses for their ongoing commitments to diversity in four primary areas: Talent Pipeline, Equitable Talent Development, CEO/Leadership Commitment, and Supplier Diversity," (Toyota Motor North America, Inc., 2014). Toyota conducts over one billion dollars of business with minority- and women-owned suppliers each year. The following list represents Toyota's recent corporate diversity and inclusion improvements:

- Percentage of employees participating in mentoring programs has doubled since 2013
- A commitment to devote more than 40 percent of all of the company's philanthropic endeavors to supporting ethnic, LGBT, veterans, and disability nonprofit groups
- 99.99 percent diverse supplier retention rate
- More than \$100 million in contracts with minority business enterprises generated since 2009 through the Toyota-hosted Opportunity Exchange for Minority Owned Businesses, which is in its 27th year
- Diversity Inc.'s "Top Company for Employee Engagement" in October 2013
- One of Diversity Inc.'s "Top 10 Companies for LGBT Employees" in 2013
- A Best Place to work for LGBT equality, according to Human Rights Campaign in 2015
- Member of The Billion Dollar Roundtable, an organization that recognizes corporations that have spent at least \$1 billion with minority and woman-owned suppliers
- Corporation of the Year from US Hispanic Chamber of Commerce in 2015

SECTION II: ECONOMIC CONTRIBUTION OF TOYOTA IN THE UNITED STATES

Toyota's economic contribution is interpreted by evaluating its direct employment and dealership operations in two scenarios. The first half of this analysis focuses on Toyota's economic contribution to the U.S. economy, and the second half discusses Toyota's economic contribution in the following nineteen states: Alabama, Arkansas, California, Florida, Georgia, Illinois, Indiana, Kentucky, Maryland, Michigan, Missouri, Mississippi, North Carolina, Ohio, South Carolina, Tennessee, Texas, Virginia, and West Virginia. These states are home to all Toyota operations throughout the United States, including but not limited to, assembly plants, dealerships, supplier service and parts distribution centers, sales regional offices, and engineering and design offices.

CAR's employment and income estimates are derived from a regional economic model, supplied by Regional Economic Models, Inc. (REMI) (the model is further explained in Section IV, Appendix I: Methodology). The model inputs—direct employment, income and compensation data—were provided by Toyota Motor North America. The intermediate and spin-off employment and earnings estimates were generated by the model. This study estimates the total number of workers related to Toyota's U.S. manufacturing operations, supporting operations, and new vehicle dealerships by analyzing Toyota's employment and income contributions to the private sector. Throughout this section, factors such as personal income generated, tax revenue generated, indirect employment created or supported, and expenditure-induced employment created or supported will depict Toyota's economic contribution to the U.S. economy.

Throughout this study, Toyota's estimated employment contribution is divided into three categories: direct, intermediate, and spin-off. Direct employment is defined as all Toyota employees from the following areas: engineering and design, finance, headquarters, manufacturing parts, manufacturing vehicle assembly, and port service and logistics. Intermediate employment is the number of supplier jobs directly related to Toyota—in all sectors of the economy. Finally, all employment resulting from spending by both direct and indirect employees is referred to as spin-off employment or expenditure-induced employment.

Toyota's Total Economic Contribution to the U.S. Economy

Toyota directly employs 135,900 persons in its U.S. manufacturing, corporate, and dealership operations. These 135,900 jobs generate an intermediate employment contribution of 108,400, and spin-off employment of 225,800—which totals 470,100 jobs that Toyota has directly provided or supported in 2015, as shown in Table 4. Comparing total employment to direct employment produces an overall employment multiplier of 3.5—meaning there are 2.5 additional jobs in the U.S. economy for every one job at Toyota. The total earnings by place of work in the private sector for all 470,100 jobs is about \$32 billion, which represents about 0.35 percent of the private sector compensation in the U.S. economy. Based on this compensation, CAR estimates that more than \$4 billion is paid for personal income taxes, more than \$3 billion is paid for contributions to the government, and more than \$1 billion is paid for personal current transfer receipts. The total net disposable income for individuals is nearly \$23.6 billion.

Table 4: Contribution of Toyota's Operations to the Economy in the United States, 2015

Economic Impact	Toyota U.S. Manufacturing-Related	Supporting Operations	Subtotal: Toyota U.S. Operations	Toyota New Vehicle Dealerships	Grand Total*
Employment					
Direct	30,700	8,100	38,800	97,100	135,900
Intermediate	62,800	7,800	70,600	37,800	108,400
Total (Direct + Intermediate)	93,500	15,900	109,400	134,900	244,300
Spin-Off	124,200	13,300	137,500	91,000	225,800*
Total (Direct + Intermediate + Spin-off)	217,700	29,200	246,900	225,900	470,100*
Multiplier: (Direct + Intermediate + Spin-off)/ Direct	7.1	3.6	6.4	2.3	3.5
Total Earnings by Place of Work, Private Non-Farm (\$ Billions Nominal)	\$15.46	\$1.98	\$17.44	\$14.95	\$32.25
Less: Contributions for Government Social Insurance and Personal Current Transfer Receipts	\$2.23	\$0.29	\$2.52	\$2.16	\$4.66
Less: Personal Income Taxes	\$1.93	\$0.25	\$2.18	\$1.95	\$4.11
Equals Private Disposable Personal Income (\$ Billions Nominal)	\$11.30	\$1.44	\$12.74	\$10.84	\$23.58
Contribution as Percent of U.S. Total Private Economy					
Employment	0.13%	0.02%	0.15%	0.14%	0.29%
Compensation	0.17%	0.02%	0.19%	0.16%	0.35%

*Numbers are rounded and adjusted for double counting in motor vehicle and parts retail industry.

Contribution Analysis of Toyota Manufacturing-Related and Supporting Operations to the U.S. Economy

The total sum of U.S. manufacturing-related and supporting operations employment that Toyota has contributed to the United States equals a total of 246,900 jobs. For total Toyota U.S. manufacturing and supporting operations, the ratio of total jobs created to direct employment produces an employment multiplier of 6.4 (246,900 ÷ 38,800)—which means for every one job in Toyota’s manufacturing-related and supporting operations, there are an additional 5.4 jobs supported in the U.S. economy. Toyota U.S. manufacturing-related jobs produce an employment multiplier of 7.1 (217,700 ÷ 30,700), or 6.1 additional jobs for every one manufacturing-related job at Toyota. When CAR conducted a similar study for Toyota based on the company’s 2010 operations, the multiplier for manufacturing-related and supporting operations was 6.2 (177,700 ÷ 28,700). Therefore, the economic contribution of Toyota’s manufacturing-related and supporting operations grew between 2010 and 2015 by an additional 0.9 jobs supported in the U.S. economy.

Total earnings in the private sector for all 246,900 manufacturing-related and supporting operations jobs contributed is more than \$17 billion, which represents about 0.19 percent of the private sector compensation in the U.S. economy. From this amount, more than \$2 billion is paid for personal income taxes, almost \$2 billion is paid for contributions to the federal, state and local governments, and \$0.67 billion is paid for personal current transfer receipts. The U.S. total net disposable income for individuals supported by Toyota manufacturing-related and supporting operations is estimated at more than \$12 billion.

Intermediate and spin-off employment contributions supported by Toyota’s U.S. manufacturing-related and supporting operations include 70,600 intermediate (supplier) jobs and 137,500 spin-off jobs. Of these 208,100 jobs, roughly 32 thousand are from the manufacturing industry and just fewer than 6 thousand are in the motor vehicles, bodies and trailers, and parts manufacturing subindustry. The other industries that are heavily represented in terms of intermediate and spin-off employment contributions are the construction industry (26,819), administrative and waste services (16,132), retail trade (15,944), and professional and technical services (15,653), as shown in Table 5. The complete industry sector breakdown of intermediate and spin-off employment supported by Toyota Motor North America’s U.S. operations can be found in Appendix II.

Table 5: Top Five Industry Sectors Supported by Toyota’s U.S. Manufacturing-Related and Supporting Operations, 2015

Industries (Sub-industries are indented and listed below the main job category)	Employment Contributions
Manufacturing	32,674
Motor vehicles, bodies and trailers, and parts manufacturing*	5,708*
Construction	26,819
Administrative and Waste Services	16,132
Retail Trade	15,944
Professional and Technical Services	15,653

*Included in Manufacturing employment

Contribution Analysis of Toyota Dealership Operations to the U.S. Economy

The following employment information is based on Toyota’s new vehicle dealerships in the United States. Using data only for operations related to new (as opposed to used and certified used) vehicle operations provides a more accurate representation of the contribution of new motor vehicle sales. There were 97,100 employees in Toyota’s U.S. automotive dealerships for both new vehicle sales and services. CAR estimates that roughly 37,800 indirect (supplier) jobs were supported by the direct dealership employment. Those jobs associated with direct and intermediate employees’ spending, or spin-off employment, added another 91,000 jobs. Combined, the total U.S. employment contribution of employment for Toyota’s new vehicle dealerships in the United States was 225,900 jobs. The ratio of total jobs by direct employment equals a multiplier of 2.3, in other words, for every job that Toyota has at its dealerships about 1.3 additional jobs were added to the U.S. economy.

Toyota dealership employment supports total earnings in the private sector of just under \$15 billion. Roughly \$2 billion is attributed to personal income taxes for employees at Toyota’s U.S. new vehicle dealerships. To put it in perspective, Toyota’s new vehicle dealerships accounted for 0.14 percent of all employment and 0.16 percent of all compensation in the private sector of the U.S. economy in 2015. In 2010, Toyota’s new vehicle dealerships accounted for 0.10 percent of all employment and 0.09 percent of all compensation in the private sector of the U.S. economy. Appendix IV, V, and VI in this document contain the economic contribution results tables for three additional CAR studies conducted for Toyota based on 2003, 2007, and 2010 employment data.

Looking specifically at intermediate and spin-off employment associated with dealership operations, CAR estimates the employment contribution equals roughly 128,800 jobs. Of these 128,800 jobs, 6,880 are specifically in the manufacturing industry and only 489 are in the subindustry related to motor vehicles, bodies and trailers, and parts manufacturing. Other industries that play a vital role in the indirect jobs contributed by new vehicle dealerships in the U.S. for Toyota are construction at 20,817 jobs, retail trade at 13,157 jobs, health care and social assistance at 12,726 jobs, administrative and waste services at 10,686 jobs, and other services, including public administration at 10,122 jobs. Each of the industries listed provides more employment than the manufacturing industry when it comes to new dealerships. This is a common result because in general, manufacturing industries demand the most from underlying intermediate and supplying industries.

Table 6: Top Five Industry Sectors Supported by Toyota’s U.S. New Vehicle Dealerships, 2015

Industries (Sub-industries are indented and listed below the main job category)	Employment Contributions
Manufacturing	6,880
Motor vehicles, bodies and trailers, and parts manufacturing*	489*
Construction	20,817
Retail Trade	13,157
Health Care and Social Assistance	12,726
Administrative and Waste Services	10,686
Other Services, including Public Administration	10,122

*Included in Manufacturing employment

Toyota's Total Economic Contribution for Nineteen States and the Rest of the U.S. Economy

Alabama

Toyota broke ground on the Huntsville Engine Plant in 2001. From its initial construction through to the present, Toyota Motor Manufacturing Alabama, Inc. (TMMAL) has captured \$864 million in investment. TMMAL produced 731,539 4-cylinder, V6, and V8 engines in 2015, making it Toyota's largest North American engine production facility. In addition to its manufacturing operations, Toyota boasts 25 dealerships throughout the state. Between the jobs created by TMMAL and at its dealerships, Toyota is responsible for 2,500 jobs in Alabama. During 2015, Toyota's charitable donations and sponsorships in Alabama exceeded \$800,000. Overall employment in 2015 for Alabama was 2,015,200, of which, Toyota's statewide employment contribution measured 9,700, or just below 0.5 percent.

Table 7: Employment Contribution of Toyota's Operations to the Alabama Economy, 2015

	Manufacturing Related	New Vehicle Dealers
Direct Employment	1,100	1,400
Intermediate	1,900	400
Spin-off	3,500	1,400
Subtotal	6,500	3,200
Total Statewide Employment Contribution:	9,700	
Total Private Non-Farm Earnings by Place of Work (\$ Millions Nominal)	\$401	
Less: Contributions for Government Social Insurance and Personal Current Transfer Receipts	\$53	
Less: Personal Income Taxes	\$44	
Equals Private Disposable Personal Income By Place of Work (\$ Millions Nominal)	\$304	

Arkansas

The state of Arkansas does not have any direct Toyota manufacturing operations, but it is home to Toyota subsidiary, Hino Motors Manufacturing, USA. Hino is a Japanese manufacturer of commercial vehicles and diesel engines, which started production of components for Toyota vehicles like the Tundra and Sequoia in October 2006. Since then the facility has received \$55 million in investment for expansion projects, and currently employs around 400 workers in the manufacturing facility. In addition to the Hino Stamping and Component facility, Toyota has 17 dealerships in Arkansas, which employ 700 people. Overall, Toyota is responsible for employing 1,100 people throughout the state. During 2015, Toyota's philanthropic activity in Arkansas totaled \$22,000. The state's total employment level was 1,260,600 in 2015, with Toyota contributed 4,300, a bit more than 0.3 percent.

Table 8: Employment Contribution of Toyota's Operations to the Arkansas Economy, 2015

	Manufacturing Related	New Vehicle Dealers
Direct Employment	400	700
Intermediate	600	200
Spin-off	1,600	800
Subtotal	2,600	1,700
Total Statewide Employment Contribution:	4,300	
Total Private Non-Farm Earnings by Place of Work (\$ Millions Nominal)	\$152	
Less: Contributions for Government Social Insurance and Personal Current Transfer Receipts	\$24	
Less: Personal Income Taxes	\$18	
Equals Private Disposable Personal Income By Place of Work (\$ Millions Nominal)	\$110	

California

California is home to research and development operations for almost every major automaker in North America. Toyota is no exception, with four R&D centers in Newport Beach, Palo Alto, Gardena, and Mountain View. These institutes, Caltex Design Research, the Toyota Research Institute, the Toyota Technical Center, and the Toyota Info Technology Center, focus on vehicle design, semi-autonomous driving research, engineering and development, and technology research and development respectively. In addition to these R&D offices, Toyota manufactures parts in Long Beach, at the Toyota Auto Body California plant, which has received \$300 million in cumulative investments and also hosts multiple Toyota Financial Services offices. Between R&D facilities, 172 dealerships, and other various operations, Toyota employs 20,700 workers in California. Toyota's charitable giving throughout the state amounted to nearly \$13 million during 2015. Total employment in 2015 was 17,798,600 with Toyota's total employment contribution at 50,990. The company's impact provided just below 0.3 percent of all employment in the state.

Table 9: Employment Contribution of Toyota's Operations to the California Economy, 2015

	Manufacturing Related	New Vehicle Dealers
Direct Employment	5,300	15,400
Intermediate	5,500	5,900
Spin-off	7,300	11,500
Subtotal	18,100	32,800
Total Statewide Employment Contribution:	50,990	
Total Private Non-Farm Earnings by Place of Work (\$ Millions Nominal)	\$1,447	
Less: Contributions for Government Social Insurance and Personal Current Transfer Receipts	\$226	
Less: Personal Income Taxes	\$208	
Equals Private Disposable Personal Income By Place of Work (\$ Millions Nominal)	\$1,013	

Florida

Florida is home to Southeast Toyota Distributors in Jacksonville, as well as, 76 dealerships throughout the state. These dealerships are responsible for directly employing 8,000 people. Through the sales and service operations in the state, Toyota directly employs 1,000 Florida residents, and indirectly employs 5,200 others through intermediate and spin-off operations. Charitable activity by Toyota exceeded \$730,000 in Florida, during 2015. In 2015, total employment throughout the state was 9,153,300, with Toyota contributing 23,500, or a bit below 0.3 percent.

Table 10: Employment Contribution of Toyota's Operations to the Florida Economy, 2015

	Manufacturing Related	New Vehicle Dealers
Direct Employment	1,000	8,000
Intermediate	1,400	3,000
Spin-off	3,800	6,300
Subtotal	6,200	17,300
Total Statewide Employment Contribution:	23,500	
Total Private Non-Farm Earnings by Place of Work (\$ Millions Nominal)	\$344	
Less: Contributions for Government Social Insurance and Personal Current Transfer Receipts	\$79	
Less: Personal Income Taxes	\$36	
Equals Private Disposable Personal Income By Place of Work (\$ Millions Nominal)	\$229	

Georgia

Toyota's presence in the state of Georgia includes a Lexus office and a Financial Service Office, along with 43 dealerships statewide. Despite a lack of direct manufacturing presence in the state, Toyota still contributes to the state's economy via dealerships, philanthropic efforts, and indirect employment. The automaker has donated more than \$15 million in Georgia, as of December 2015. Roughly \$3.5 million, was used for Toyota's philanthropic activity. Toyota employs 3,200 workers directly at Toyota dealerships and service offices in the state. Georgia's total employment level was 4,490,900 in 2015, with Toyota's impact providing 13,100 jobs, or 0.3 percent.

Table 11: Employment Contribution of Toyota's Operations to the Georgia Economy, 2015

	Manufacturing Related	New Vehicle Dealers
Direct Employment	100	3,100
Intermediate	1,400	1,100
Spin-off	4,300	3,100
Subtotal	5,800	7,300
Total Statewide Employment Contribution:	13,100	
Total Private Non-Farm Earnings by Place of Work (\$ Millions Nominal)	\$368	
Less: Contributions for Government Social Insurance and Personal Current Transfer Receipts	\$57	
Less: Personal Income Taxes	\$43	
Equals Private Disposable Personal Income By Place of Work (\$ Millions Nominal)	\$268	

Illinois

Toyota operates sales and financial service offices in the state of Illinois that assist with the processing of auto lease and finance payments. According to recent estimates, these offices directly employ 200 workers. In addition to the financial services related jobs, Toyota also employs 3,200 people at its 57 dealerships throughout the state. The combined employment of the finance and insurance handling and new vehicle dealership employment in Illinois, along with the activities of other Toyota employees through the U.S., provides employment opportunities for 3,400 workers in Illinois. Toyota's impact within the state extends well beyond direct employment, with 34 tier one suppliers located in Illinois. Donations and sponsorships in Illinois exceeded \$900,000 in 2015. Total employment in the state was 6,126,300 in 2015, with Toyota contributing 18,400, or 0.3 percent.

Table 12: Employment Contribution of Toyota's Operations to the Illinois Economy, 2015

	Manufacturing Related	New Vehicle Dealers
Direct Employment	200	3,200
Intermediate	2,900	1,300
Spin-off	7,700	3,100
Subtotal	10,800	7,600
Total Statewide Employment Contribution:	18,400	
Total Private Non-Farm Earnings by Place of Work (\$ Millions Nominal)	\$815	
Less: Contributions for Government Social Insurance and Personal Current Transfer Receipts	\$110	
Less: Personal Income Taxes	\$112	
Equals Private Disposable Personal Income By Place of Work (\$ Millions Nominal)	\$593	

Indiana

Indiana is home to two Toyota manufacturing operations. The largest is Toyota Motor Manufacturing Indiana, Inc. (TMMI) in Princeton, which produced 375,647 Sequoia, Highlander, and Sienna vehicles during 2015. In addition to TMMI, Subaru of Indiana Automotive, Inc. (SIA) began producing the Toyota Camry in 2007 under contract with Toyota. In 2015, SIA produced 79,843 Camrys for Toyota, however, the Camry production contract between the two automakers ended in May 2016. The economic contribution of the partnership with SIA is not included in the study results, and represents an additional benefit to the U.S. economy. To date, there are 5,300 workers employed directly by Toyota's Indiana facilities, including Toyota Logistics Services, and 1,300 employees working in 31 Toyota dealerships throughout the state. In total, Toyota has invested \$4.6 billion in Indiana, with \$4.3 billion invested in TMMI, and nearly \$300 million directed to SIA. Additionally, during 2015, philanthropic activity in Indiana exceeded of \$2.1 million. Indiana's total employment level was 3,109,200 in 2015. The overall jobs impact of Toyota was 27,500, or 0.9 percent of all jobs in the state.

Table 13: Employment Contribution of Toyota's Operations to the Indiana Economy, 2015

	Manufacturing Related	New Vehicle Dealers
Direct Employment	5,300	1,300
Intermediate	7,800	500
Spin-off	10,900	1,700
Subtotal	24,000	3,500
Total Statewide Employment Contribution:	27,500	
Total Private Non-Farm Earnings by Place of Work (\$ Millions Nominal)	\$1,621	
Less: Contributions for Government Social Insurance and Personal Current Transfer Receipts	\$200	
Less: Personal Income Taxes	\$203	
Equals Private Disposable Personal Income By Place of Work (\$ Millions Nominal)	\$1,218	

Kentucky

Kentucky is home to Toyota Motor Manufacturing Kentucky, Inc. (TMMK), which currently produces the Camry/Camry Hybrid, Avalon/Avalon Hybrid, Venza, and the Lexus ES 350. The plant is Toyota's largest manufacturing facility outside of Japan, and produced over 450,000 vehicles in 2015. Georgetown also produced over 570,000 4-cylinder and V6 engines during 2015. Overall, TMMK represents investments totaling \$6 billion. Toyota has invested a further \$670 million to headquarter their senior management of engineering, design, development, R&D, and North American manufacturing operations in Erlanger. Additionally, Toyota has a parts distribution center located in Hebron. Between these facilities, Toyota employs 9,400 people in the state of Kentucky. Toyota's charitable activities reached nearly \$7 million in Kentucky during 2015. The total employment level throughout the state was 1,847,900, with the total impact of Toyota's operations providing 29,700 jobs, or 1.6 percent.

Table 14: Employment Contribution of Toyota's Operations to the Kentucky Economy, 2015

	Manufacturing Related	New Vehicle Dealers
Direct Employment	9,400	1,100
Intermediate	8,200	300
Spin-off	9,500	1,200
Subtotal	27,100	2,600
Total Statewide Employment Contribution:	29,700	
Total Private Non-Farm Earnings by Place of Work (\$ Millions Nominal)	\$1,814	
Less: Contributions for Government Social Insurance and Personal Current Transfer Receipts	\$209	
Less: Personal Income Taxes	\$210	
Equals Private Disposable Personal Income By Place of Work (\$ Millions Nominal)	\$1,395	

Maryland

Maryland is home to a Toyota Motor Sales, U.S.A. regional sales office, which helps coordinate Toyota vehicle sales, parts, and service for dealers in Maryland and surrounding states. Toyota Financial Services operates a customer service center in Maryland that provides finance and insurance products and services to the Toyota family of brands. Toyota operates a parts distribution center in Glen Burnie, as well. These facilities directly employ 700 Maryland residents. In addition, throughout the state 31 new vehicle dealers directly employ 2,600 residents. Almost \$2.6 million in donations and sponsorships were placed in the state during 2015. Total employment in Maryland was 2,988,100 in 2015, with Toyota contributing 8,800, or 0.3 percent.

Table 15: Employment Contribution of Toyota's Operations to the Maryland Economy, 2015

	Manufacturing Related	New Vehicle Dealers
Direct Employment	700	2,600
Intermediate	700	600
Spin-off	1,900	2,300
Subtotal	3,300	5,500
Total Statewide Employment Contribution:	8,800	
Total Private Non-Farm Earnings by Place of Work (\$ Millions Nominal)	\$250	
Less: Contributions for Government Social Insurance and Personal Current Transfer Receipts	\$36	
Less: Personal Income Taxes	\$37	
Equals Private Disposable Personal Income By Place of Work (\$ Millions Nominal)	\$177	

Michigan

Toyota supports 1,400 jobs in Michigan due to direct employment at Toyota Technical Center (TTC), Caltly Design Research Facility, a Toyota Financial Services office, and the Hino Motors Manufacturing, U.S.A. headquarters, a Toyota Group subsidiary. In total, Toyota has invested \$1.2 billion in its Michigan facilities. Jobs are also being created at the new Toyota Research Institute in Ann Arbor, with a focus on autonomous driving. The TTC has been in Michigan for over 30 years, and oversees the design and development of vehicles. Launched in 2011, the Collaborative Safety Research Center is based out of TTC. Caltly Design Research Facility in Ann Arbor focuses on production development, and the Hino headquarters performs administrative, sales, purchasing, and quality assurance activities for the company. Additionally, in 2015 alone, Toyota's donations and sponsorship activity in Michigan exceeded \$2.3 million. The overall employment level was 4,493,000 in 2015. The total employment impact of Toyota's operations was 13,500, providing 0.3 percent of all Michigan employment.

Table 16: Employment Contribution of Toyota's Operations to the Michigan Economy, 2015

	Manufacturing Related	New Vehicle Dealers
Direct Employment	1,400	1,200
Intermediate	2,500	600
Spin-off	6,000	1,800
Subtotal	9,900	3,600
Total Statewide Employment Contribution:	13,500	
Total Private Non-Farm Earnings by Place of Work (\$ Millions Nominal)	\$660	
Less: Contributions for Government Social Insurance and Personal Current Transfer Receipts	\$96	
Less: Personal Income Taxes	\$91	
Equals Private Disposable Personal Income By Place of Work (\$ Millions Nominal)	\$473	

Mississippi

Toyota Motor Manufacturing Mississippi, Inc. (TMMMS) is located in Blue Springs and began operations in 2011 and by 2015, TMMMS was responsible for the production of 190,514 Toyota Corollas. Total investments in the facility exceed \$960 million. Due to the opening of TMMMS, Toyota's direct employment in Mississippi has increased dramatically in the last five years from 65 workers in 2010 to 1,500 in 2015. In addition to the direct employment provided by manufacturing operations, Toyota has 18 dealerships throughout the state, which provide 600 jobs for Mississippi residents. In 2015, Toyota's charitable contributions in Mississippi totaled \$5.6 million. Mississippi's total employment level was 1,189,600 in 2015, of which Toyota contributed 6,700 jobs, or 0.6 percent.

Table 17: Employment Contribution of Toyota's Operations to the Mississippi Economy, 2015

	Manufacturing Related	New Vehicle Dealers
Direct Employment	1,500	600
Intermediate	1,300	200
Spin-off	2,300	800
Subtotal	5,100	1,600
Total Statewide Employment Contribution:	6,700	
Total Private Non-Farm Earnings by Place of Work (\$ Millions Nominal)	\$307	
Less: Contributions for Government Social Insurance and Personal Current Transfer Receipts	\$40	
Less: Personal Income Taxes	\$32	
Equals Private Disposable Personal Income By Place of Work (\$ Millions Nominal)	\$235	

Missouri

Bodine Aluminum was acquired by Toyota in 1990 and has expanded from the original facility in St. Louis to an additional facility in Troy. These two plants are responsible for the manufacture of engine components. As of December 2015, \$345 million was invested in Bodine Aluminum's Troy location and about \$19 million was invested in its St. Louis facility making total investment for both facilities around \$365 million. In addition to Bodine operations, Missouri is home to a Toyota Motor Sales, U.S.A. regional sales office, which helps coordinate Toyota vehicle sales, parts, and service for 27 dealers in Missouri and others in surrounding states. Toyota Financial Services operates an office in Missouri that provides finance and insurance products and services to the Toyota family of brands. These facilities combined directly employ 1,000 individuals in the state. Toyota donated approximately \$500,000 in the state, during 2015. Missouri had an overall employment level of 2,958,200 in 2015. With 10,000 jobs resulting from Toyota's activities, the company provided more than 0.3 percent of state employment.

Table 18: Employment Contribution of Toyota's Operations to the Missouri Economy, 2015

	Manufacturing Related	New Vehicle Dealers
Direct Employment	1,000	1,200
Intermediate	2,000	500
Spin-off	3,700	1,600
Subtotal	6,700	3,300
Total Statewide Employment Contribution:	10,000	
Total Private Non-Farm Earnings by Place of Work (\$ Millions Nominal)	\$476	
Less: Contributions for Government Social Insurance and Personal Current Transfer Receipts	\$66	
Less: Personal Income Taxes	\$54	
Equals Private Disposable Personal Income By Place of Work (\$ Millions Nominal)	\$356	

North Carolina

Toyota's TMS Motorsports Marketing promotes its brand in NASCAR and other U.S. racing series. TRD, U.S.A., a division of TMS, develops and assembles engines in North Carolina to drive Toyota's racing programs. TRD U.S.A. is also responsible for providing trackside technical service to support Toyota's NHRA and NASCAR programs. Toyota directly employs 5,200 North Carolina residents. Of these direct employees, 40.4 percent work in manufacturing, while the remaining, 59.6 percent are employed at 46 statewide dealerships. Toyota's philanthropic support in North Carolina during 2015 was almost \$200,000. North Carolina had an overall employment level of 4,495,500 in 2015, with Toyota providing a total of 18,600 across direct, indirect, and spin-off jobs, making the company responsible for 0.4 percent.

Table 19: Employment Contribution of Toyota's Operations to the North Carolina Economy, 2015

	Manufacturing Related	New Vehicle Dealers
Direct Employment	2,100	3,100
Intermediate	3,600	1,000
Spin-off	5,800	3,000
Subtotal	11,500	7,100
Total Statewide Employment Contribution:	18,600	
Total Private Non-Farm Earnings by Place of Work (\$ Millions Nominal)	\$769	
Less: Contributions for Government Social Insurance and Personal Current Transfer Receipts	\$107	
Less: Personal Income Taxes	\$94	
Equals Private Disposable Personal Income By Place of Work (\$ Millions Nominal)	\$568	

Ohio

The state of Ohio is home to one of Toyota's U.S. regional sales offices, a Toyota Financial Services office, and a Toyota Parts Distribution Center. Ohio is also home to 55 dealerships throughout the state, which directly employ 2,500 people. The total statewide employment contribution of Toyota to Ohio is 2,700 employees. Toyota's donations and sponsorships in Ohio exceeded \$4.5 million in 2015. Total employment in Ohio was 5,423,000 in 2015, with the overall contribution of Toyota being 19,300 jobs, or 0.4 percent.

Table 20: Employment Contribution of Toyota's Operations to the Ohio Economy, 2015

	Manufacturing Related	New Vehicle Dealers
Direct Employment	200	2,500
Intermediate	3,200	1,000
Spin-off	9,500	2,900
Subtotal	12,900	6,400
Total Statewide Employment Contribution:	19,300	
Total Private Non-Farm Earnings by Place of Work (\$ Millions Nominal)	\$879	
Less: Contributions for Government Social Insurance and Personal Current Transfer Receipts	\$119	
Less: Personal Income Taxes	\$119	
Equals Private Disposable Personal Income By Place of Work (\$ Millions Nominal)	\$641	

South Carolina

Toyota does not have direct manufacturing-related employment in the state of South Carolina. The automaker does, however, support 1,400 jobs through a dealership network, boasting 24 locations throughout the state. In addition, Toyota indirectly supports 2,900 South Carolina jobs through the presence of tier one suppliers in the state, and through operations in other states, and has donated over \$3 million to philanthropic efforts in South Carolina since December 2015. Toyota directed nearly \$600,000 in charitable contributions to South Carolina in 2015. In 2015, total employment in South Carolina was 2,122,600. The statewide employment contribution from Toyota's operations, even without direct employment, was 6,100, or 0.3 percent.

Table 21: Employment Contribution of Toyota's Operations to the South Carolina Economy, 2015

	Manufacturing Related	New Vehicle Dealers
Direct Employment	0	1,400
Intermediate	600	400
Spin-off	2,300	1,400
Subtotal	2,900	3,200
Total Statewide Employment Contribution:	6,100	
Total Private Non-Farm Earnings by Place of Work (\$ Millions Nominal)	\$168	
Less: Contributions for Government Social Insurance and Personal Current Transfer Receipts	\$28	
Less: Personal Income Taxes	\$19	
Equals Private Disposable Personal Income By Place of Work (\$ Millions Nominal)	\$121	

Tennessee

Toyota's Bodine Aluminum Inc. produces aluminum cylinder blocks and automatic transmission parts in Tennessee. As of December 2015, total investment in Bodine Aluminum's Jackson facility equaled about \$284 million. Tennessee also hosts a Toyota Financial Services office. Additionally, Toyota is a customer of other Tennessee companies that produce display products, engine sensors, exhaust systems, alternators, and more. Toyota employs 2,300 workers in Tennessee and approximately 87.0 percent of these employees work in Toyota's 31 Tennessee dealerships. During 2015, Tennessee received more than \$300,000 in donations and sponsorships from Toyota. Tennessee's overall employment level was 2,886,000 in 2015, thus Toyota's total employment contribution of 13,000 represents 0.5 percent of all jobs in the state.

Table 22: Employment Contribution of Toyota's Operations to the Tennessee Economy, 2015

	Manufacturing Related	New Vehicle Dealers
Direct Employment	300	2,000
Intermediate	1,800	700
Spin-off	5,900	2,300
Subtotal	8,000	5,000
Total Statewide Employment Contribution:	13,000	
Total Private Non-Farm Earnings by Place of Work (\$ Millions Nominal)	\$517	
Less: Contributions for Government Social Insurance and Personal Current Transfer Receipts	\$67	
Less: Personal Income Taxes	\$52	
Equals Private Disposable Personal Income By Place of Work (\$ Millions Nominal)	\$398	

Texas

Texas is home to the Toyota Motor Manufacturing Texas, Inc. (TMMTX) assembly plant in San Antonio, multiple Toyota Financial Services offices, and the distributor Gulf States Toyota (GST). Headquartered in Houston, GST is an independent distributorship operating a total of 154 dealerships in 5 states. TMMTX was established in 2003 and represents a total investment of \$2.6 billion. In 2015, the assembly facility was responsible for the production of 232,910 Toyota Tundra and Tacoma pickup trucks. The automaker also employs 9,000 Texas residents at their 101 statewide dealerships. In 2015, Toyota announced plans to invest \$350 million to relocate their North American headquarters from Torrance, California to Plano, Texas. This move will effect Toyota Motor Sales U.S.A. and Toyota Financial Services, in Torrance, California; Toyota Motor Engineering & Manufacturing North America in Erlanger, Kentucky.; and some employees from Toyota Motor North America in New York. As of April 2016, the automaker has about 500 employees working in temporary offices in Plano, with plans to spend close to \$1 billion to relocate nearly 3,500 others. Toyota’s calendar year 2015 philanthropic activities in Texas totaled approximately \$3.2 million. The overall employment contribution from Toyota’s operation was 50,000, or 0.4 percent of the 12,494,400 jobs in Texas in 2015.

Table 23: Employment Contribution of Toyota's Operations to the Texas Economy, 2015

	Manufacturing Related	New Vehicle Dealers
Direct Employment	5,200	9,000
Intermediate	8,300	4,300
Spin-off	13,300	9,900
Subtotal	26,800	23,200
Total Statewide Employment Contribution:	50,000	
Total Private Non-Farm Earnings by Place of Work (\$ Millions Nominal)	\$1,920	
Less: Contributions for Government Social Insurance and Personal Current Transfer Receipts	\$230	
Less: Personal Income Taxes	\$207	
Equals Private Disposable Personal Income By Place of Work (\$ Millions Nominal)	\$1,483	

Virginia

The state of Virginia is home to 41 Toyota dealerships, which directly employ 3,300 people. Despite having no direct manufacturing employment in Virginia, Toyota supports the state's economy indirectly with 3,800 intermediate and spin-off jobs through their operations in other states. The company has also donated more than \$48 million to the state through various philanthropic efforts as of December 2015, with more than \$700,000 in 2015. Virginia had a total employment level of 4,051,900 in 2015, of which Toyota's employment contribution of 10,700 represents 0.3 percent.

Table 24: Employment Contribution of Toyota's Operations to the Virginia Economy, 2015

	Manufacturing Related	New Vehicle Dealers
Direct Employment	0	3,300
Intermediate	700	800
Spin-off	3,100	2,800
Subtotal	3,800	6,900
Total Statewide Employment Contribution:	10,700	
Total Private Non-Farm Earnings by Place of Work (\$ Millions Nominal)	\$288	
Less: Contributions for Government Social Insurance and Personal Current Transfer Receipts	\$45	
Less: Personal Income Taxes	\$38	
Equals Private Disposable Personal Income By Place of Work (\$ Millions Nominal)	\$205	

West Virginia

Buffalo is home to Toyota Motor Manufacturing West Virginia, Inc. (TMMWV), one of Toyota's three engine and transmission operations in North America. In 2015, the facility was responsible for the production of 697,755 engines and 537,594 transmissions. Total investment in TMMWV was \$1.2 billion at the end of 2015. West Virginia is also home to Toyota's Hino Motors Manufacturing U.S.A., Inc., which assembles trucks in the state. Toyota directly employs 1,900 West Virginians, 1,300 manufacturing-related and the state's 13 dealerships directly employs the remaining 600 individuals. Toyota's charitable activities contributed nearly \$900,000 to West Virginia during 2015. The 2015 employment level in West Virginia was 732,100, with Toyota contributing 5,000 jobs, or 0.7 percent.

Table 25: Employment Contribution of Toyota's Operations to the West Virginia Economy, 2015

	Manufacturing Related	New Vehicle Dealers
Direct Employment	1,300	600
Intermediate	800	100
Spin-off	1,700	500
Subtotal	3,800	1,200
Total Statewide Employment Contribution:	5,000	
Total Private Non-Farm Earnings by Place of Work (\$ Millions Nominal)	\$271	
Less: Contributions for Government Social Insurance and Personal Current Transfer Receipts	\$34	
Less: Personal Income Taxes	\$31	
Equals Private Disposable Personal Income By Place of Work (\$ Millions Nominal)	\$206	

Rest of United States

Toyota conducts a number of operations in the rest of the United States, which include engineering and design, financial services, sales offices, and dealership operations. These operations take place at places such as the Toyota Financial Savings Bank in Nevada, as well as in offices in Arizona, New York, Washington D.C., and more. Throughout the rest of the U.S., Toyota employs 37,600 people, 35,300 of whom are employed through Toyota's network of 614 dealerships. Dealership employment represents approximately 94 percent of Toyota's total direct employment in the rest of the U.S. While Toyota's direct giving is largely concentrated in the states where its facilities are located, the remainder of the United States nonetheless received a substantial amount - \$19.5 million - during 2015. Throughout the remainder of the United States, 2015 total employment was 52,228,600, and Toyota's total employment contribution was 134,100 – 0.3 percent.

Table 26: Employment Contribution of Toyota's Operations to the Remaining U.S. States' Economies Combined, 2015

	Manufacturing Related	New Vehicle Dealers
Direct Employment	2,300	35,300
Intermediate	15,500	15,000
Spin-off	33,200	32,800
Subtotal	51,000	83,100
Total Statewide Employment Contribution:	134,100	
Total Private Non-Farm Earnings by Place of Work (\$ Millions Nominal)	\$3,972	
Less: Contributions for Government Social Insurance and Personal Current Transfer Receipts	\$698	
Less: Personal Income Taxes	\$529	
Equals Private Disposable Personal Income By Place of Work (\$ Millions Nominal)	\$2,745	

SECTION III: CONCLUDING REMARKS

Toyota Motor North America makes significant economic contributions to the U.S. economy, as well as to the economies of the states in which Toyota's major operations are located. Toyota's four U.S.-based assembly locations produce 70 percent of the Toyota and Lexus vehicles sold in the United States.

Toyota's sales have grown steadily since the company first arrived in the United States in 1958, and in 2015, Toyota ranked third in U.S. sales. Toyota's employment and estimated economic contributions to the U.S. economy have also grown. Since 2003, overall Toyota U.S. employment has increased by nearly a third to 135,900 direct employees; since 2010, Toyota's total U.S. employment has grown 20 percent.

Toyota's commitment to the United States is also demonstrated in the company's investments in U.S. plants, equipment and facilities, and its corporate operations. Over the past 20 years, two out of every three dollars Toyota has invested in North America have been spent on U.S. facilities—including 15 new facilities, 28 expansions, and 4 other investments. The company's philosophy drives its environmental stewardship, diversity, and community involvement efforts, as well. Toyota's philanthropic activities have resulted in \$700 million in charitable giving to U.S. non-profit organizations that focus on conservation, education, and safety.

CAR's economic contribution estimate for 2015 Toyota's overall U.S. operations, including dealerships, results in an employment multiplier of 3.5—which is 0.3 jobs higher than what was estimated in 2010. The company's manufacturing multiplier has grown even more—from an estimated 6.2 in 2010 to 7.1 in this study of 2015 operations. That means for every Toyota manufacturing job in the United States, there are now 0.9 more jobs in the U.S. economy in 2015 than the same job produced in 2010. While these 2015 estimates are similar to those produced in CAR's first study of Toyota's economic contribution in 2003—CAR cautions against comparing the current results to those produced based on 2003 data. Since that time, there have been several economic and methodological changes that have affected the economic estimates—including industry-wide increased offshoring of automotive parts production, and updates to the way the model handles population migration, investment, and compensation.

Toyota's direct manufacturing-related and supporting operations employment supports jobs in just about every other sector of the U.S. economy. When thinking of Toyota suppliers, manufacturers of steel, parts, components, and assemblies might come to mind. However, Toyota's overall employment supports over 208,000 jobs in the economy, and just 16 percent (32,674) of these were in manufacturing—and of those jobs, just 17 percent of the over 32,000 manufacturing jobs were in the motor vehicles, bodies and trailers, and parts manufacturing industry sector. Toyota buys directly from construction to build their factories, transportation and warehousing to move its component purchases into plants and products to market, and professional and technical services to engineer and advertise their products, to name but a few. Automotive manufacturing has a deep and broad supply chain, and Toyota's contribution to the United States economy demonstrates the reach and the impact of U.S.-based light vehicle manufacturing in the United States.

SECTION IV: APPENDICES

Appendix I: Methodology

In order to conduct the analyses detailed in this study, a regional economic impact model was specially constructed, and Toyota-specific data (employment, payroll, philanthropy) was inputted. This model then generated estimates of the economic contribution associated with Toyota's U.S. operations. This study is the fourth economic contribution study for Toyota researched and conducted by CAR. The prior studies have been:

- Contribution of Toyota to the Economies of Fourteen States and the United States in 2003, released June, 2005
- Contribution of Toyota Motor North America to the Economies of Sixteen States and the United States in 2006, released October, 2007
- Contribution of Toyota Motor North America to the Economies of Sixteen States and the United States in 2010, released December, 2010

Macroeconomic Model

The estimates generated in this study are derived from analyses using a regional economic model, supplied by Regional Economic Models, Inc. (REMI), of Amherst, Massachusetts. The REMI model is a computable general equilibrium (CGE) model, which is a computer model that maps how an economy works and how it responds to policy or economic changes. These models present data on dozens of economic sectors and reflect how the various sectors interact with each other. In this economic contribution study, the REMI model is used to estimate the number of jobs supported or created by Toyota, as well as the subsequent personal income generated and personal income taxes paid because of Toyota's U.S. operations and U.S. dealerships. The REMI model, which has been fully documented and peer-reviewed, was designed for the type of analysis employed in this current study, and has been used by CAR and other organizations for over two decades for policy and industrial development analysis.

The version of the model used in this study represents the economies of 19 states—Alabama, Arkansas, California, Florida, Georgia, Illinois, Indiana, Kentucky, Maryland, Michigan, Missouri, Mississippi, North Carolina, Ohio, South Carolina, Tennessee, Texas, Virginia, West Virginia—and the rest of the United States, which was analyzed as one region. The model simulates the interaction between the aforementioned regional economies and the rest of the nation, which accounts for interregional trade and migration. Trade flows, migration patterns and commuter flows connect each state economy, allowing for dynamic multi-regional analysis. Therefore, the model can simulate economic impacts in any one region that may result from a change in Toyota's activities in any or all of the regions. Toyota provided data on their company's employment and compensation in each state during 2015.

The approach for this study was to use a specially constructed REMI model and then to input Toyota's employment and wage data into the model, which then generated estimates of the economic contributions (employment, income, taxes, GDP changes) associated with Toyota's operations for each of 19 states and the rest of the country. To start, the calibrated model is first run to establish a baseline economy. Next, various economic scenarios—by state or for all of Toyota's operations across the country—were input into the model and simulations based on the new data were calculated. In these

scenarios, Toyota's employment and compensation were subtracted to "shock" the economy. Simulation results were interpreted as the new economic equilibrium and were the product of multiple structural equation iterations across the state economies. The difference between the simulation scenario and the baseline model represents Toyota's economic significance to an individual state's economy and to the U.S. economy as a whole. The model then reported the economic changes from the baseline in a number of variables, with the most easily understood being employment. This technique allows for the separation of economic activity influenced by the operations of suppliers, assemblers, and dealers from the aggregate economy and permits the capture of economic contributions from continued employment in the sectors of interest for any given time period.

The REMI model also simulates interactions between U.S. states and the rest of the world, which accounts for interregional trade and migration. For this reason, the model can simulate economic impacts that occur within a given area but are the result of changes in other regions of the economy. Types of changes that could impact other regions include variations in the level of industrial activities, as well as macroeconomic or microeconomic policy changes.

Within the framework of the REMI model, there is an inter-industry, input-output (I-O) table that calculates demand for intermediate inputs used in the production of a finished good. For this reason, it is possible to double-count the contributions between suppliers, dealerships and other Toyota operations. However, the CAR research team made adjustments to avoid double-counting between Toyota-specific suppliers and the downstream employment results calculated by the model.

Study and Results Variations

CAR has conducted studies for Toyota that present jobs multiplier results from 2003 through 2015. Results can change from study to study due to fluctuating macroeconomic conditions in the U.S. and variations in the REMI model. There is also the potential for inconsistencies in study methodologies.

Model Structure

The REMI model has changed considerably over time, with new equations added and existing equations modified as the program has moved from one edition to another. For every new economic contribution study that CAR undertakes, the model used in the most recent previous study is compared to the current model and the two are examined for potential impact on results and study-to-study consistency. These changes are often the greatest contributor to the changes in the results of the studies since the construction of impact models plays a major role in their results.

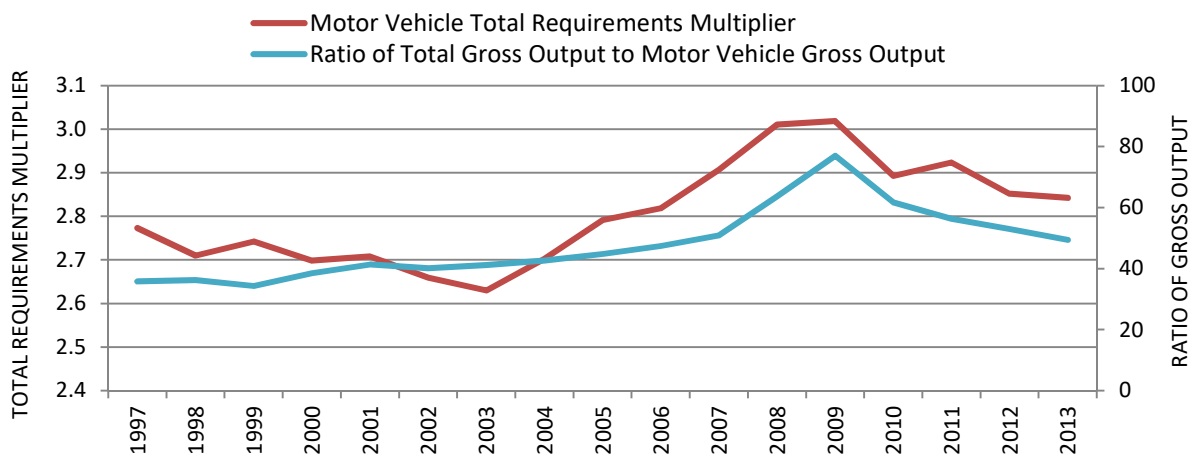
Industry Structure

Virtually all impact models and multipliers are based upon input-output tables (U.S. Bureau of Economic Analysis, 2015). As a result, certain assumptions are present in study conclusions. Primary among these is the assumption of fixed inputs or "recipe" based production. There is only one way in which a given output can be created (Leontief production functions); changes to the input requirements result from changes in production technology. In other words, the material, machinery and labor needed to build a car do not change when demand is weak, only the number of cars made will change. Consequently, multipliers should be invariant to macroeconomic context. However, persistent changes which lead to making cars in a different way will change the multipliers. For example, the new CAFE standards have

resulted in a shift from steel towards aluminum, and, insofar as the labor requirements of the steel and aluminum industries differ, the amount of indirect employment created by the automobile industry will change.

In practice, multipliers are largely representations of the ratio of spending by one industry to spending across all industries. If industry-specific and total spending grow at different rates, the multipliers will change. This appears to explain the vast majority of the fluctuation in the motor vehicle sector’s total requirements multiplier, as described in the US input-output table. This relationship is depicted in Figure 12, which shows the motor vehicle total requirements multiplier moving with the ratio of total gross output to motor vehicle gross output.

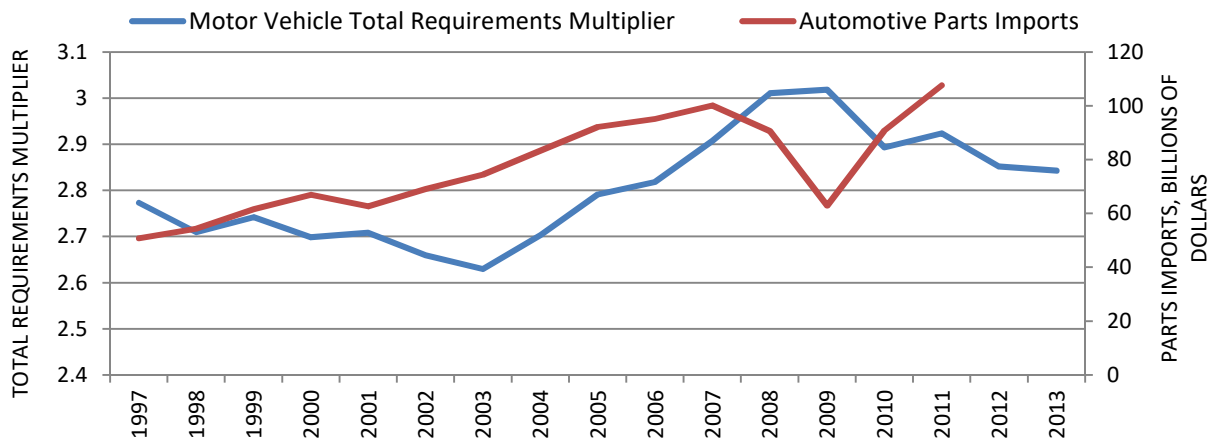
Figure 12: Motor Vehicle Total Requirements Multiplier and Motor Vehicle Manufacturing Share of Total Gross Product



Source: Bureau of Economic Analysis

Trade is handled by a given set of input-output tables or impact models that will also play an important role in the determination of multipliers and impact estimates. If imports are treated as an exogenous source, shifting sources of intermediate inputs across domestic and foreign sources will change the impact, with increased imports yielding a smaller multiplier. In the U.S. input-output tables, imported intermediate inputs are attributed to their respective industry, so an increased use of imported intermediate parts will not have a dramatic impact on the multiplier. However, at the state level, the impact models rework this so that trade does have an impact on the results; so that increasing imports decreases the multipliers and impact estimates. This accounts for much of the differences in state-level results over the years. Figure 13 shows how the total requirements multiplier has varied over time in relationship to the volume of U.S. automotive parts imports.

Figure 13: The Evolution of the Motor Vehicle Total Requirements Multiplier and Auto Parts Imports: 1997-2013



Source: Bureau of Economic Analysis and the International Trade Administration

Note that the direction of the correlation between the total requirements multiplier and the level of imports is inconsistent: From 2003 through 2007, they largely have a positive correlation—the series move together in the same direction—but both prior to 2003 and after 2007, the correlation is negative: As stated, imports do not drive the multiplier from the U.S. input-output tables because they have been attributed to their respective industries, rather than as exogenous inputs. Imports can, however, impact state-level results.

Since CAR’s first study for Toyota in 2003, several economic changes have affected study results.

- One example of economic change is the movement of jobs that require high amounts labor and low amounts of technology to offshore facilities. Products created from this type of labor are now sourced from overseas production facilities.
- Another change that has occurred within the REMI model is that migration equations, which are the movement of population from area to area due to economic pulls or pushes, have been updated to more accurately reflect the mobility of the population. Investment equations, which represent a second change within REMI, have been modified to reflect the age structure of existing facilities by area. The results of these changes are that investment demand forecasts more accurately reflect a given area’s need to replace capital structures.
- Yet another change to the REMI model occurred in the compensation module, in which transfer payment categories and variables have changed. Overall transfer payments continue to reflect actual economic activity. However, detailed categories within transfer payments (social insurance payments, transfer receipts, other miscellaneous categories) are not comparable between newer and older versions of the model.

CAR and its predecessor organization have been the leading institutions nationwide for research regarding the economic contributions on the local, regional or national levels of the automotive industry, automotive and supplier manufacturing and services, R&D and infrastructure investment. CAR uses the latest practices in economic forecasting and the studies reflect current industry trends,

challenges, and company practices. CAR's economic contribution studies are used by manufacturers, policymakers, and economic developers to inform decisions and better understand the industry. Importantly, these economic contribution studies have proven to be quite valuable in contributing to the dialogue between automakers and federal and state government representatives.

Appendix II: Intermediate and Spin-off Employment Contribution of Toyota's Operations and Dealership in the United States, 2015

Industries (Sub-industries are indented and listed below the main job category)	Employment Contributions	
	Manufacturing-related and Supporting Operations	Dealerships
Forestry, Fishing, Related Activities, and Other	349	200
Mining	4,264	1,973
Utilities	798	353
Construction	26,819	20,817
Manufacturing	32,674	6,880
Wood product manufacturing	1,108	486
Nonmetallic mineral product manufacturing	1,511	486
Primary metal manufacturing	2,715	221
Fabricated metal product manufacturing	8,439	1,108
Machinery manufacturing	2,628	438
Computer and electronic product manufacturing	1,225	107
Electrical equipment and appliance manufacturing	596	186
Motor vehicles, bodies and trailers, and parts manufacturing	5,708	489
Other transportation equipment manufacturing	339	144
Furniture and related product manufacturing	484	334
Miscellaneous manufacturing	827	319
Food manufacturing	714	822
Beverage and tobacco product manufacturing	150	96
Textile mills; Textile product mills	614	134
Apparel manufacturing; Leather and allied product manufacturing	(155)	(160)
Paper manufacturing	636	208
Printing and related support activities	678	484
Petroleum and coal products manufacturing	134	59
Chemical manufacturing	1,323	451
Plastics and rubber product manufacturing	3,000	468
Wholesale Trade	12,365	4,140
Retail Trade	15,944	13,157
Transportation and Warehousing	9,108	5,895
Information	3,488	2,632
Finance and Insurance	13,703	8,589
Real Estate and Rental and Leasing	6,714	5,939
Professional and Technical Services	15,653	9,188
Management of Companies and Enterprises	5,799	1,429
Administrative and Waste Services	16,132	10,686
Educational Services	3,475	3,208
Health Care and Social Assistance	14,218	12,726
Arts, Entertainment, and Recreation	5,151	4,168
Accommodation and Food Services	8,947	6,704
Other Services, including Public Administration	12,427	10,122
Subtotal	208,028	128,806
Grand Total		334,124*

*TOTAL number is adjusted for double counting in motor vehicle and parts retail industry.

Appendix III: Intermediate and Spin-off Employment Contribution of Toyota's Operations and Dealership in the United States, 2010

Industries (Sub-industries are indented and listed below the main job category)	Employment Contributions	
	Manufacturing-related and Supporting Operations	Dealerships
Forestry, Fishing, Related Activities, and Other	306	268
Mining	626	382
Utilities	377	314
Construction	5,766	6,198
Manufacturing	30,862	5,592
Wood product manufacturing	1,150	332
Nonmetallic mineral product manufacturing	-	-
Primary metal manufacturing	2,973	909
Fabricated metal product manufacturing	1,220	211
Machinery manufacturing	589	150
Computer and electronic product manufacturing	486	139
Electrical equipment and appliance manufacturing	18,501	439
Motor vehicles, bodies and trailers, and parts manufacturing	-	-
Other transportation equipment manufacturing	428	350
Furniture and related product manufacturing	236	204
Miscellaneous manufacturing	521	485
Food manufacturing	-	-
Beverage and tobacco product manufacturing	926	132
Textile mills; Textile product mills	-	-
Apparel manufacturing; Leather and allied product manufacturing	846	821
Paper manufacturing	-	-
Printing and related support activities	1,089	503
Petroleum and coal products manufacturing	-	-
Chemical manufacturing	1,915	917
Plastics and rubber product manufacturing	1,150	332
Wholesale Trade	8,115	2,833
Retail Trade	10,852	8,733
Transportation and Warehousing	7,026	3,766
Information	2,585	2,200
Finance and Insurance	9,702	6,271
Real Estate and Rental and Leasing	5,264	4,292
Professional and Technical Services	13,126	8,811
Management of Companies and Enterprises	2,212	1,225
Administrative and Waste Services	10,926	8,944
Educational Services	2,688	1,180
Health Care and Social Assistance	11,762	8,367
Arts, Entertainment, and Recreation	2,674	1,884
Accommodation and Food Services	6,694	4,153
Other Services, including Public Administration	17,492	12,648
Subtotal	149,055	88,061
Grand Total		237,116

**TOTAL number is adjusted for double counting in motor vehicle and parts retail industry.*

Appendix IV: 2010 Toyota Economic Contribution Study Results

Economic Impact	Toyota U.S. Manufacturing-Related	Supporting Operations	Subtotal: Toyota U.S. Operations	Toyota New Vehicle Dealerships	Grand Total*
Employment					
Direct	28,700	5,700	34,400	79,700	114,100
Intermediate	55,400	4,600	60,000	33,400	93,400
Total (Direct + Intermediate)	84,100	10,300	94,400	113,000	207,400
Spin-Off	93,600	9,400	103,000	54,700	157,700
Total (Direct + Intermediate + Spin-off)	177,700	19,700	197,400	167,700	365,100
Multiplier: (Direct + Intermediate + Spin-off) / Direct	6.2	3.5	5.7	2.1	3.2
Total Earnings by Place of Work, Private Non-Farm (\$ Billions Nominal)	\$11.65	\$1.19	\$12.84	\$8.56	\$21.39
Less: Contributions for Government Social Insurance	\$2.17	\$0.28	\$2.44	\$1.70	\$4.15
Less: Personal Income Taxes	\$1.28	\$0.14	\$1.42	\$1.00	\$2.42
Equals Private Disposable Personal Income (\$ Billions Nominal)	\$8.20	\$0.77	\$8.98	\$5.86	\$14.83
Contribution as Percent of U.S. Total Private Economy					
Employment	0.10%			0.10%	0.20%
Compensation	0.08%			0.09%	0.20%

*Numbers are rounded and adjusted for double counting in motor vehicle and parts retail industry.

Source: Center for Automotive Research, 2010

Appendix V: 2007 Toyota Economic Contribution Study Results

	Manufacturer-related	New Vehicle Dealer-related	Total
Direct	33,187	85,040	118,227
Intermediate	58,930	31,590	90,520
Total (Direct + Intermediate)	92,117	116,630	208,747
Spin-off	106,551	66,100	172,651
Total (Direct + Intermediate + Spin-off)	198,668	182,730	381,398
Multiplier: (Direct + Intermediate + Spin-off)/Direct	6.0	2.1	3.2
Compensation (\$billions nominal)	\$13.72	\$10.76	\$24.48
Less: transfer payments, social contributions	(\$2.46)	(\$1.91)	(\$4.37)
Less: personal income taxes	(\$1.76)	(\$1.42)	(\$3.19)
Equals private disposable personal income (\$billions nominal)	\$9.49	\$7.44	\$16.92
Contribution as % of total private economy			
Employment	0.11%	0.10%	0.21%
Compensation	0.10%	0.08%	0.18%

Note: Due to rounding, columns or rows may not sum exactly

Source: Center for Automotive Research 2007

Appendix VI: 2003 Toyota Economic Contribution Study Results

	Manufacturer-related	New Vehicle Dealer-related	Total
Direct	29,135	74,060	103,195
Intermediate	74,660	38,990	113,650
Total (Direct + Intermediate)	103,795	113,050	216,845
Spin-off	107,205	62,250	169,455
Total (Direct + Intermediate + Spin-off)	211,000	175,300	386,300
Multiplier: (Direct + Intermediate + Spin-off)/Direct	7.2	2.4	3.7
Compensation (\$billions nominal)	\$8.27	\$6.13	\$14.39
Less: transfer payments	(\$0.75)	(\$0.63)	(\$1.38)
Less: social insurance contributions	(\$0.65)	(\$0.48)	(\$1.12)
Less: personal income taxes	(\$1.23)	(\$0.90)	(\$2.13)
Equals private disposable personal income (\$billions nominal)	\$5.64	\$4.12	\$9.76
Contribution as % of total private economy			
Employment	0.13%	0.10%	0.23%
Compensation	0.09%	0.07%	0.16%

Note: Due to rounding, columns or rows may not sum exactly

Source: Center for Automotive Research 2003

Appendix VII: References

- Board of Governors of the Federal Reserve System. (2016, May 6). *Consumer Credit - G.19*. Retrieved from Federal Reserve: <http://www.federalreserve.gov/releases/g19/current/>
- Buckle Up for Life. (2013). *About Our Program*. Retrieved from Buckle Up for Life: <http://buckleupforlife.org/about-our-program/>
- Carlisle, C. (2016, April 5). *Toyota reaches \$1 billion milestone for move into new Plano headquarters*. Retrieved from Dallas Business Journal: <http://www.bizjournals.com/dallas/news/2016/04/05/toyota-reaches-1-billion-milestone-for-move-into.html>
- CBC News. (2015, November 10). *Toyota to make RAV4 in plant that lost Corolla production*. Retrieved from CBC News Business: <http://www.cbc.ca/news/business/toyota-rav4-cambridge-1.3312297>
- Durbin, D.-A. (2016, February 3). *After years of courting younger buyers with their own brand, Toyota discovered that what they really wanted was Toyotas*. Retrieved from U.S. News: <http://www.usnews.com/news/business/articles/2016-02-03/toyota-discontinues-scion-after-years-of-slumping-sales>
- Federal Reserve Bank of St. Louis. (2016, March 7). *Average Maturity of New Car Loans at Finance Companies, Amount of Finance Weighted*. Retrieved from FRED Economic Data: <https://research.stlouisfed.org/fred2/series/DTCTLVENMNM>
- Federal Reserve Bank of St. Louis. (2016, June 3). *Employment Level: Part-Time for Economic Reasons, All Industries*. Retrieved from FRED Economic Data: <https://research.stlouisfed.org/fred2/series/LNS12032194>
- Federal Reserve Bank of St. Louis. (2016, April 7). *Finance Rate on Consumer Installment Loans at Commercial Banks, New Autos 48 Month Loan*. Retrieved from FRED Economic Data: <https://research.stlouisfed.org/fred2/series/TERMCBAUTO48NS>
- Federal Reserve Bank of St. Louis. (2016, March 10). *Household and Nonprofit Organizations; Net Worth, Level*. Retrieved from FRED Economic Data: <https://research.stlouisfed.org/fred2/series/TNWBSHNO>
- Federal Reserve Bank of St. Louis. (2016, May 17). *Housing Starts: Total: New Privately Owned Housing Units Started*. Retrieved from FRED Economic Data: <https://research.stlouisfed.org/fred2/series/HOUST/>
- Federal Reserve Bank of St. Louis. (2016, June 1). *Light Weight Vehicle Sales*. Retrieved from <https://research.stlouisfed.org/fred2/series/LTOTALNSA>: <https://research.stlouisfed.org/fred2/series/LTOTALNSA>
- Federal Reserve Bank of St. Louis. (2016, June 1). *Light Weight Vehicle Sales: Autos and Light Trucks*. Retrieved from FRED Economic Data: <https://research.stlouisfed.org/fred2/series/ALTSALES>

- Federal Reserve Bank of St. Louis. (2015, October 21). *Median Household Income in the United States*. Retrieved from FRED Economic Data: <https://research.stlouisfed.org/fred2/series/MEHOINUSA646N>
- Federal Reserve Bank of St. Louis. (2016, May 6). *Motor Vehicle Loans Owned and Securitized, Outstanding*. Retrieved from FRED Economic Data: <https://research.stlouisfed.org/fred2/series/MVLOAS>
- Federal Reserve Bank of St. Louis. (2016, May 27). *Real Gross Domestic Product*. Retrieved from FRED Economic Data: <https://research.stlouisfed.org/fred2/series/GDPC1>
- Federal Reserve Bank of St. Louis. (2016, May 13). *University of Michigan: Consumer Sentiment* ©. Retrieved from FRED Economic Data: <https://research.stlouisfed.org/fred2/series/UMCSENT/>
- Federal Reserve Bank of St. Louis. (2012, June 26). *Weighted-Average Maturity of New Car Loans at Auto Finance Companies (Discontinued)*. Retrieved from FRED Economic Data: <https://research.stlouisfed.org/fred2/series/TERMFCWAMNCLNS>
- Greimel, H. (2015, November 5). *Toyota plans \$1 billion U.S. outlay to advance artificial intelligence*. Retrieved from Automotive News: [http://www.autonews.com/article/20151105/OEM06/151109879/toyota-plans-\\$1-billion-u.s.-outlay-to-advance-artificial-intelligence](http://www.autonews.com/article/20151105/OEM06/151109879/toyota-plans-$1-billion-u.s.-outlay-to-advance-artificial-intelligence)
- LeBeau, P. (2016, May 19). *Auto loans roar to trillion dollar level*. Retrieved from CNBC: <http://www.cnbc.com/2016/05/19/auto-loans-roar-to-trillion-dollar-level.html>
- Motif Investing. (2016, May 19). *Cheap Gas Has New Car Buyers Thinking Big*. Retrieved from Seeking Alpha: <http://seekingalpha.com/article/3976312-cheap-gas-new-car-buyers-thinking-big>
- Muller, D. (2016, April 7). *Ann Arbor picked for third Toyota Research Institute location*. Retrieved from MLive: http://www.mlive.com/auto/index.ssf/2016/04/ann_arbor_picked_for_third_toy.html
- Toyota Motor North America, Inc. (2014, May 14). *Toyota is Sole Automaker to be Named One of DiversityInc's Top 50 Companies for Diversity*. Retrieved from Toyota USA Newsroom: <http://corporatenews.pressroom.toyota.com/releases/toyota+named+among+top+50+diversity+inc.htm>
- Toyota Motor North America, Inc. (2015, November 20). *Toyota Crowned Champion of Diversity and Equality*. Retrieved from Toyota USA Newsroom: <http://corporatenews.pressroom.toyota.com/releases/toyota+nul+diversity+champion+nov20.htm>
- Toyota Motor North America, Inc. (2015, December). *Our U.S. Operations Map*. Retrieved from Toyota Operations: <http://www.toyota.com/usa/operations/fast-facts>

- Toyota Motor North America, Inc. (2016). *TogetherGreen (United States)*. Retrieved from Toyota Global:
http://www.toyota-global.com/sustainability/social_contribution/environment/overseas/togethergreen/
- Toyota Motors North America, Inc. (2016). *Grant Guidelines & Applications Toyota USA Foundation*. Retrieved from Toyota Global:
http://www.toyota.com/usa/community/articles/community_grants_foundation.html
- Toyota Motors Sales, U.S.A., Inc. (2012). *75 Years of Toyota*. Retrieved May 11, 2016, from
http://www.toyota-global.com/company/history_of_toyota/75years/
- U.S. Bureau of Economic Analysis. (2015). *National Income and Product Account (NIPA) Input-Output Tables*. Retrieved from U.S. Bureau of Economic Analysis:
<http://www.bea.gov/national/index.htm>
- United States Department of Labor. (2016, June 3). *Alternative Measures of Labor Underutilization*. Retrieved from Bureau of Labor Statistics Economic News Releases:
<http://www.bls.gov/news.release/empst.t15.htm>
- Ward's Automotive. (Various Years). *Demographics of New Vehicle Buyers and Initial Vehicle Quality*. Retrieved from Ward's Auto.