THE CENTER FOR AUTOMOTIVE RESEARCH (CAR)

Automotive industry contract research and service organization (non-profit) with more than 30 years experience forecasting industry trends, advising on public policy, and sponsoring multi-stakeholder communication forums.
Areas to Watch

- Michigan’s share of U.S. vehicle production increased to 18.8%.
- Michigan’s engine production will decrease and transmission production will increase over the next few years.
- Electrified vehicle market share increased to 4.4%, the highest level ever recorded.
Positive Factors in the CAR Forecast

- Projected moderate U.S. economic output growth in 2019
- Historically low U.S. unemployment rates
- Relatively low oil prices continue through 2020
- Underlying nominal wage growth continues
- High levels of consumer confidence were reached in Q4 2018, and
- Solid new housing starts and home prices rebounding to pre-recession levels

Risks to the Forecast

- Section 232 Steel & Aluminum Tariffs
- Section 301 China Tariffs
- U.S.-China Talks
- China Auto Sales Slowdown
- USMCA Ratification ?
- Section 232 Auto & Parts Tariffs
- U.S.-Japan Talks
- Japan Economic Slowdown
- U.S.-EU Talks
- BREXIT
- U.S.-U.K. Talks
- Recession?
- Geopolitical Risks
- Consumer Confidence
- Interest Rates
- UAW Negotiations/Strike
CAR's U.S. Light Vehicle Sales Forecast 2019-2025

U.S Sales

<table>
<thead>
<tr>
<th>Year</th>
<th>Sales (in Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>17.4</td>
</tr>
<tr>
<td>2016</td>
<td>17.5</td>
</tr>
<tr>
<td>2017</td>
<td>17.2</td>
</tr>
<tr>
<td>2018</td>
<td>17.2</td>
</tr>
<tr>
<td>2019</td>
<td>16.8</td>
</tr>
<tr>
<td>2020</td>
<td>16.5</td>
</tr>
<tr>
<td>2021</td>
<td>16.4</td>
</tr>
<tr>
<td>2022</td>
<td>16.8</td>
</tr>
<tr>
<td>2023</td>
<td>17.3</td>
</tr>
<tr>
<td>2024</td>
<td>17.6</td>
</tr>
<tr>
<td>2025</td>
<td>17.7</td>
</tr>
</tbody>
</table>

Source: CAR Research, January 2019

U.S. Light Vehicle Monthly Sales and SAAR: April 2016 to April 2019

Source: Ward's Auto; CAR Research
U.S. Light Vehicle Sales
Percent Change (YTD) Through April: 2019 vs. 2018

Passenger Cars
-8.5%

Light Trucks
-2.2%

Total
-2.2%

Source: Wards Auto; CAR Research

Percent Change in Sales of Light Vehicles Per OEM:
YTD Through April: 2019 vs. 2018

TOTAL LV Sales
-2.2%

Hyundai/Kia
3.7%

Honda
1.5%

Ford
-2.4%

FCA
-3.5%

Toyota
-4.8%

GM
-6.0%

Nissan/Mitsubishi
-6.7%

Source: Wards Auto; CAR Research
U.S. Market Share: YTD April 2019

- **GM**: Units: 896,013, Market Share: 16.8%
- **Ford**: Units: 762,134, Market Share: 14.3%
- **Toyota**: Units: 727,580, Market Share: 13.7%
- **FCA**: Units: 667,198, Market Share: 12.5%
- **Nissan/Mitsubishi**: Units: 510,579, Market Share: 9.6%
- **Honda**: Units: 495,562, Market Share: 9.3%
- **Hyundai - Kia**: Units: 396,794, Market Share: 7.5%

Source: WardsAuto; CAR Research

U.S. Electrified Light Vehicle Sales by Propulsion Technologies
1999 – 2019 YTD Through April

- **Hybrid**
- **Plug-In Hybrid**
- **Electric**

Note: Electrified vehicles consist of BEV, HEV and PHEV

Source: Ward’s Automotive Reports (from 2010 and on), HybridCars.com and CAR Research
CAR’s U.S. Light Vehicle Production Forecast 2019-2025

U.S. Production

<table>
<thead>
<tr>
<th>Year</th>
<th>U.S. Vehicle Production (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>11.7</td>
</tr>
<tr>
<td>2016</td>
<td>12.1</td>
</tr>
<tr>
<td>2017</td>
<td>11.2</td>
</tr>
<tr>
<td>2018</td>
<td>11.2</td>
</tr>
<tr>
<td>2019</td>
<td>11.3</td>
</tr>
<tr>
<td>2020</td>
<td>10.9</td>
</tr>
<tr>
<td>2021</td>
<td>10.6</td>
</tr>
<tr>
<td>2022</td>
<td>11.1</td>
</tr>
<tr>
<td>2023</td>
<td>11.6</td>
</tr>
<tr>
<td>2024</td>
<td>11.7</td>
</tr>
<tr>
<td>2025</td>
<td>11.7</td>
</tr>
</tbody>
</table>

Source: CAR Research, January 2019

2019 Light Vehicle Production: Michigan Ranks 1st in the U.S.; 2nd in NAFTA Region

Source: Ward’s Auto Intelligence
Michigan Powertrain Production Forecasts:
2019 to 2026

Transmission Production

Engine Production

Source: LMC Automotive 1Q 2019

Employment Overview

Areas to Watch:

• At the end of Q1 2019, Michigan motor vehicle & parts manufacturing employment increased by 2.2% YOY

• Michigan holds the highest share (21.4%) of U.S. automotive employment, down 0.5 percentage point from the fourth quarter last year


Michigan Employment by Automotive-Related Industries Professionals And Engineering, Vehicles & Parts Dealer Employment Increased March 2019

Michigan Automotive Supplier Establishments and Employment Per Establishment
2014 – 2018


Michigan Automotive Supplier Establishments and Supplier Employment Per Motor Vehicle Manufacturing Employment
2014 – 2018

Investment Overview

Areas to Watch

• Since the recession, automakers have announced roughly $131.2B across North America.
• In Q1 2019, Michigan received 55% of U.S. investment.
• FCA has announced 2 of Michigan’s largest investments – both at $1.6B each for Mack Engine and Sterling Heights.

Note – the following Book of Deals analysis covers publicly announced capital investments made by automakers throughout North America.

N.A. Announced Automaker Investment by Region

<table>
<thead>
<tr>
<th>Region</th>
<th>Investment Amount ($USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>$8.2B</td>
</tr>
<tr>
<td>United States</td>
<td>$98.2B</td>
</tr>
<tr>
<td><strong>U.S. Great Lakes</strong></td>
<td><strong>$63.1B</strong></td>
</tr>
<tr>
<td>Michigan</td>
<td>$32.8B</td>
</tr>
<tr>
<td>South</td>
<td>$22.3B</td>
</tr>
<tr>
<td>Mexico</td>
<td>$24.8B</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$131.2B</strong></td>
</tr>
</tbody>
</table>

Note: U.S. Great Lakes includes: IL, IN, KY, MI, MO, and OH
South includes: AL, FL, GA, MS, SC, TN, and TX

Source: CAR Book of Deals, Q1 2019
Automaker Announced Investment: MI vs. Other States
Q1 2019

**Michigan Announced Investment, 2009 to Q1 2019**

- Investment
- MI Share of U.S.

**Share of U.S. Announced Automaker Investment by State, Q1 2019**

- Michigan: 55%
- Tennessee: 12%
- Illinois: 14%
- Ohio: 9%
- Alabama: 4%
- Kentucky: 3%
- West Virginia: 2%
- Maryland: 1%
- Other States: 54.6%

**Source:** CAR Book of Deals, Q1 2019

Automaker Investments in Michigan
Q1 2019

**FCA:** $3.5 Billion (6 announcements)
- Mack Ave Engine: $1.6B
- Jefferson North: $900.0M
- Warren Truck: $500.0M
- Sterling Heights/Warren (Stamping): $400.0M
- Dundee Engine: $119.0M
- Auburn Hills (Components Plants): $12.6M

**GM:** $356.0 Million (4 announcements)
- Orion Township: $300.0M
- Lansing Delta: $36.0M
- Romulus Powertrain: $20.0M
- Flint: Not Disclosed

**Waymo:** $13.6 Million (1 announcement)
- Detroit (AAM’s Tech Center): $13.6M

**Source:** CAR Book of Deals, Q1 2019
### GM Announcements

<table>
<thead>
<tr>
<th>Plant</th>
<th>Products</th>
<th>End of Production</th>
<th>Employment</th>
<th>Union Local</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detroit/Hamtramck</td>
<td>LaCrosse, Volt, CT6, Impala</td>
<td>June 1, 2019 January 2020</td>
<td>1,542</td>
<td>UAW Local 22</td>
</tr>
<tr>
<td>Lordstown</td>
<td>Cruze</td>
<td>March 1, 2019</td>
<td>1,618</td>
<td>UAW Local 1112</td>
</tr>
<tr>
<td>Oshawa</td>
<td>Impala, XTS, Silverado, Sierra</td>
<td>Q4 2019</td>
<td>2,900</td>
<td>Unifor Local 222</td>
</tr>
<tr>
<td>Warren Trans.</td>
<td>6 Speed Trans</td>
<td>August 1, 2019</td>
<td>335</td>
<td>UAW Local 909</td>
</tr>
<tr>
<td>Baltimore Ops.</td>
<td>Pickup transmissions</td>
<td>April 1, 2019</td>
<td>310</td>
<td>UAW Local 239</td>
</tr>
</tbody>
</table>

### YOY Change in U.S. Passenger Car Market Shares

**2013 – 2018**

![YOY Change in U.S. Passenger Car Market Shares](chart.png)

Source: IHS Markit

Source: CAR analysis of LMC Automotive data


Source: CAR analysis of LMC Automotive data
Export Overview

Areas to Watch

- **Michigan automotive exports were $26.8 Billion** in 2018
- **61%** of Michigan vehicles exports go to Canada
- **70%** of Michigan auto parts exports to NAFTA region
Top Ten U.S. States by Automotive Exports in Dollar Terms:
Michigan Motor Vehicle Exports decreased 1.03% in 2018 Total

The major destinations for Michigan exports are Mexico and Canada

The United States cannot currently self-supply the vehicles American dealers sell to U.S. consumers.

Sourcing of U.S. Light Vehicle Sales
2018

<table>
<thead>
<tr>
<th>Source:</th>
<th>Domestic data</th>
<th>CENTER FOR AUTOMOTIVE RESEARCH</th>
<th>31</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Production</td>
<td>10.8 million</td>
<td></td>
<td></td>
</tr>
<tr>
<td>less U.S. Exports</td>
<td>- 1.8 million</td>
<td></td>
<td></td>
</tr>
<tr>
<td>plus U.S. Imports</td>
<td>+ 8.2 million</td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S. Sales</td>
<td>= 17.2 million</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Tariffs are piling up on light vehicles

- China Tariffs @ 25%
- Aluminum Tariffs @ 10%
- Steel Tariffs @ 25%
- Potential Parts Tariffs @ 25%
- No Tariffs

~60%

Source: Center for Automotive Research

U.S. Consumer & Economic Impacts of U.S. Automotive Trade Policies

- Assume:
  - USMCA is ratified,
  - Section 232 tariffs on steel & aluminum remain in place on all current countries,
  - Section 301 China tariffs remain at current levels, and
  - Section 232 auto & parts tariffs are levied at 25% on all trading partners except Canada, Mexico, & South Korea

[Source: Center for Automotive Research]
Impact of USMCA, Section 232 Steel & Aluminum Tariffs, Section 301 China Tariffs & Potential Section 232 Auto & Parts Tariffs

+$2,750 average
+$1,900 U.S.-built
+$3,700 imports

-366,900 jobs

-$30.4B GDP

-1.3M fewer U.S. sales
-$43.6B dealership revenue
-77,000 dealership jobs

Source: Center for Automotive Research
NAFTA Timeline Under Trade Promotion Authority

**Figure 1. Congressional Timeline**

- **Negotiation**
  - Negotiations begin (as drafted)
  - 30-day notification to Congress of intention to begin negotiations
  - 45 days after notification (to begin negotiations)
  - 60 days after notification (to complete negotiations)
  - 90 days after notification (to submit a report)
  - 180 days after notification (to conclude negotiations)

- **Agreement signed**
  - 5/16/2019

- **Congressional Consideration and Implementation**
  - Implementing bill introduced to House and Senate (no deadline)
  - House must vote on bill
  - Senate must vote on bill
  - President implements agreement by proclamation (no deadline)

- **Aiming for**
  - 1/1/2020
  - 4/19/2019

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**U.S.-China Light Vehicle & Parts Trade (USD Billions)**

2016-2018

- **DOMESTIC EXPORTS**
  - 2016: 8.3
  - 2017: 9.5
  - 2018: 6.0

- **IMPORTS FOR CONSUMPTION**
  - 2016: 1.2
  - 2017: 1.7
  - 2018: 1.5

- **DOMESTIC EXPORTS**
  - 2016: 2.3
  - 2017: 2.7
  - 2018: 2.7

- **IMPORTS FOR CONSUMPTION**
  - 2016: 12.9
  - 2017: 13.2
  - 2018: 15.3

Source: U.S. International Trade Commission

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Source: CRS

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Trends in Monthly China Motor Vehicle and Parts Domestic Exports and Imports for Consumption
2016-2018

Brief China Trade Update

U.S. raised tariffs from 10% to 25% – includes all automotive goods
U.S. moves to impose tariffs on nearly all Chinese imports – including consumer goods
China retaliates with tariffs on $60B U.S. imports (rates increase from 5-10% to 20-25%)
Average increase in cost due to tariffs/U.S.-built vehicle = $190
Section 232 on Autos & Parts
Presidential Decision due by Saturday, 18 May 2019;
Executive Order Expected TODAY
Thank you