Michigan Automotive Industry Update

Kristin Dziczek
Director, Industry, Labor & Economics Group
Center for Automotive Research
Governor’s Economic Outlook Briefing
22 November 2016
“...as we know, there are known knowns; there are things we know we know. We also 
know there are known unknowns; that is to say we know there are some things we do 
not know. But there are also unknown unknowns – the ones we don't know we don't 
know. And if one looks throughout the history of our country and other free countries, 
it is the latter category that tend to be the difficult ones.”

– Donald H. Rumsfeld
12 February 2002
CAR U.S. Light Vehicle Sales Forecast

2016 – 2020

Source: CAR Research, October 2016
Michigan production and employment slow through 2020.
The Economic and Political Context of CAR’s Forecast

On the positive side...

- +2.1 million full-time employees since October 2015
- Unemployment rate inched up to 5.0%, but labor force participation rate increased by 0.3 percentage point from a year ago
- Equity markets are at the historic high
- Gasoline is at low level and is expected to remain low
- U.S. housing starts maintained momentum at annual rate of 1.1-1.2 million units
- Light truck market share is over 60%—the highest level ever
- Auto loans are affordable for now, despite higher light vehicle prices

Not so positive...

- Uncertainty over future Trump economic policies—what can he deliver?
- Toughening immigration policies could hinder domestic output and increase price inflation
- The first three quarters of 2016 economic growth was 1.7%—lower than expected
- Total consumption spending on motor vehicle declined
- Business investment contracted due to low energy prices
- Strong dollar will drive higher interest rates and inflation
- Vehicle affordability will drop
- What goes up, must come down...eventually
U.S. Share of North American Production is Shrinking.

Source: Ward’s Automotive, CAR
Market Share Breakdown:
U.S. Light Vehicle Sales by Automaker, YTD and October 2016

- **GM**: YTD 17.1%, October 18.9%
- **Ford**: YTD 15.0%, October 13.7%
- **Toyota**: YTD 13.9%, October 13.6%
- **FCA**: YTD 13.1%, October 13.0%
- **Honda**: YTD 9.4%, October 9.2%
- **Nissan**: YTD 8.3%, October 8.0%
- **Hyundai-Kia**: YTD 8.2%, October 8.1%

Source: Automotive News and CAR Research
Market Share Segment Breakdown:
U.S. YTD LV Segment Sales Y/Y Change – October 2016 vs. 2015

Source: Ward's Automotive Reports
Michigan Motor Vehicle Production:
Unchanged from September 2015

MI Motor Vehicle Production
- Production
- MI Share of U.S.

September 2016: 208,976

2009 avg.: 85,647

State Shares of U.S. Vehicle Production—2016 YTD (September)

Michigan 20%
Ohio 13%
Kentucky 11%
Indiana 11%
Alabama 9%
Missouri 6%
Tennessee 6%
Illinois 6%
All Other States 18%

Source: Automotive News
Michigan Automotive Manufacturing Employment:
59,000 Jobs Added Since 2009, Up 53%

MI Motor Vehicle & Parts Manufacturing Employment

Number of Employees

- Employment
- MI Share of U.S.

September 2016: 165,000

2009 avg.: 108,100


- Michigan 21%
- Ohio 12%
- Indiana 10%
- Kentucky 7%
- All other states 45%
- Alabama 5%

*U.S. data is one month behind state data

Segment Breakdown of Michigan Production vs. U.S. Sales:
Michigan Production Concentrated on Pickups and SUVs (2016 YTD through September)

Michigan LV Production Share

U.S. Share

Source: Automotive News; Ward’s Automotive Reports
North America Per Vehicle Operating Profits: 2010 – Q3 2016, USD Billions

*Former Chrysler Group LLC after 2014 data is for FCA Group instead of FCA US
**Honda also excludes motorcycle, finance, and power products
***Honda and Toyota have yet to release Q3 figures

Source: CAR Research based on companies’ financial reports.

<table>
<thead>
<tr>
<th></th>
<th>GM</th>
<th>Ford</th>
<th>FCA US*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>$24,900</td>
<td>$24,176</td>
<td>$22,896</td>
</tr>
<tr>
<td>2008</td>
<td>$24,176</td>
<td>$23,793</td>
<td>$25,798</td>
</tr>
<tr>
<td>2009</td>
<td>$24,022</td>
<td>$25,798</td>
<td>$27,669</td>
</tr>
<tr>
<td>2010</td>
<td>$26,700</td>
<td>$28,036</td>
<td>$29,029</td>
</tr>
<tr>
<td>2011</td>
<td>$31,163</td>
<td>$27,931</td>
<td>$29,581</td>
</tr>
<tr>
<td>2012</td>
<td>$30,849</td>
<td>$27,790</td>
<td>$29,202</td>
</tr>
<tr>
<td>2013</td>
<td>$29,959</td>
<td>$27,774</td>
<td>$29,075</td>
</tr>
<tr>
<td>2014</td>
<td>$29,585</td>
<td>$25,008</td>
<td>$29,346</td>
</tr>
<tr>
<td>2015</td>
<td>$29,967</td>
<td>$25,253</td>
<td>$29,202</td>
</tr>
<tr>
<td>Q1 2016</td>
<td>$30,278</td>
<td>$28,985</td>
<td>$29,132</td>
</tr>
<tr>
<td>Q2 2016</td>
<td>$30,075</td>
<td>$28,774</td>
<td>$30,278</td>
</tr>
<tr>
<td>Q3 2016</td>
<td>$30,173</td>
<td>$29,029</td>
<td>$29,926</td>
</tr>
</tbody>
</table>

*Former Chrysler Group LLC after 2014 data is for FCA Group instead of FCA US

Source: CAR Research based on companies' financial reports.
Per Vehicle Labor Cost Changes, 1999-2019

Source: Center for Automotive Research estimates
Announced Automotive Investment:
Michigan Captured 24% of NAFTA Investment Through Q3 2016

Source: Center for Automotive Research Book of Deals, October 2016
# Recent Research from CAR

<table>
<thead>
<tr>
<th>Potential Cost Savings and Additional Benefits of Convergence of Safety Regulations between the United States and the European Union</th>
<th>The Economic Implications of Potential NHTSA and EPA Regulatory Revisions on U.S. Light Truck Sales and Manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed Materials Solutions: Alternative Materials for Door Assemblies</td>
<td>An Assessment of Powertrain Technology Costs Associated with Meeting CAFE and GHG Standards</td>
</tr>
<tr>
<td>Impact of Automated Vehicle Technologies on Driver Skills</td>
<td>Assessing the Fleet-wide Material Technology and Costs to Lightweight Vehicles</td>
</tr>
<tr>
<td>The Impact of New Mobility Services on the Auto Industry</td>
<td>Building Capacity and Capability in the Bio-based Materials Manufacturing Sector</td>
</tr>
</tbody>
</table>
The Growing Role of Mexico in the North American Automotive Industry

*Trends, Drivers and Forecasts*

Prepared by CAR

Prepared for Automotive Communities Partnership

July 2016
Mexican Automotive Wages are One-Eighth to One-Fifth the Wages Paid to U.S. Hourly Auto & Parts Workers

Average Hourly Wages for Production and Non-Supervisory Workers in Motor Vehicle and Parts, 2007-2014

Mexico is a Global Export Base for Autos and Parts

13 FTAs, 44 Countries

- North American Free Trade Agreement (NAFTA)
- Colombia - Mexico
- Costa Rica - Mexico
- European Union - Mexico
- Nicaragua - Mexico
- Chile - Mexico
- EFTA - Mexico
- Israel - Mexico
- Northern Triangle - Mexico
- Uruguay - Mexico
- Japan - Mexico
- Peru - Mexico
- Central America – Mexico
Mexican Production and Exports

- Can reach 60% of global GDP tariff-free
- Nine new plants announced since 2009: $10.6 billion (BMW, Ford, Honda, Hyundai-Kia, Mazda, Nissan-2, Toyota, VW/Audi)
- Exported $46.2 billion in vehicles and $39.9 billion in parts to U.S. in 2014 (Net $63.6 billion)

Source: LMC and U.S. ITA
## U.S.-Mexico Parts Trade: Top Five Categories, 2010-2015

### Top Five Auto Parts Exported from the United States to Mexico, 2010-2015

<table>
<thead>
<tr>
<th>Ranking</th>
<th>By Volume</th>
<th>2015</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>5-year change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PARTS AND ACCESSORIES FOR VEHICLES HDG 8701 TO 8705, NESOI</td>
<td>2,795</td>
<td>4,842</td>
<td>4,981</td>
<td>4,186</td>
<td>3,172</td>
<td>4,596</td>
<td>64.4%</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PARTS AND ACCESSORIES, NESOI, OF BODIES HDG 8701,8705</td>
<td>2,366</td>
<td>1,969</td>
<td>2,065</td>
<td>2,730</td>
<td>2,739</td>
<td>2,686</td>
<td>13.5%</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>COMPRESSION-IGNITION INTERNAL COMBUSTION PISTON ENGINES FOR PROPULSION OF VEHICLES OF CHAPTER 87, TO BE INSTALLED IN ROAD TRACTORS, BUSES, AUTOS, TRUCKS</td>
<td>1,216</td>
<td>1,693</td>
<td>1,863</td>
<td>2,228</td>
<td>3,779</td>
<td>2,635</td>
<td>116.7%</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>PARTS FOR SPARK-IGNITION INTERNAL COMBUSTION PISTON ENGINES FOR USE IN ROAD TRACTORS, MOTOR BUSES, AUTOMOBILES OR TRUCKS</td>
<td>546</td>
<td>934</td>
<td>1,018</td>
<td>1,126</td>
<td>1,257</td>
<td>1,296</td>
<td>137.4%</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>GEAR BOXES FOR VEHICLES OF HEADING 8703</td>
<td>811</td>
<td>805</td>
<td>941</td>
<td>1,113</td>
<td>1,021</td>
<td>1,100</td>
<td>35.6%</td>
<td></td>
</tr>
</tbody>
</table>

Source: U.S. International Trade Administration

### Top Five Auto Parts Imported to the United States from Mexico, 2010-2015

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<th>2015</th>
<th>2010</th>
<th>2011</th>
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<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>5-year change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>INSULATED IGNITION WIRING SETS &amp; WIRING SETS FOR VEHICLES, AIRCRAFT OR SHIPS</td>
<td>3,774</td>
<td>4,743</td>
<td>5,510</td>
<td>5,686</td>
<td>6,522</td>
<td>7,074</td>
<td>87.4%</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>OTHER PARTS AND ACCESSORIES, NESOI, OF BODIES (INC CABS) OF HEADING 8701 TO 8705</td>
<td>2,250</td>
<td>2,654</td>
<td>3,316</td>
<td>3,732</td>
<td>4,082</td>
<td>4,482</td>
<td>99.2%</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>SEAT PARTS OF A KIND USED FOR MOTOR VEHICLES, NESOI</td>
<td>1,398</td>
<td>1,682</td>
<td>2,271</td>
<td>2,634</td>
<td>3,082</td>
<td>3,467</td>
<td>148.0%</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>SPARK-IGNITION RECIPROCATING PISTON ENGINES TO BE INSTALLED IN ROAD TRACTORS, MOTOR</td>
<td>820</td>
<td>1,533</td>
<td>1,832</td>
<td>2,458</td>
<td>2,432</td>
<td>2,279</td>
<td>177.9%</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>PARTS, NESOI, OF MOTOR VEHICLES, NESOI, OF HEADINGS 8701 TO 8705,</td>
<td>1,166</td>
<td>1,385</td>
<td>1,630</td>
<td>1,663</td>
<td>1,895</td>
<td>2,185</td>
<td>87.4%</td>
<td></td>
</tr>
</tbody>
</table>

Source: U.S. International Trade Administration
Automaker Investment Announcements
2013-2016 YTD through October

<table>
<thead>
<tr>
<th>Region</th>
<th>Investment (in billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>$4.4 billion (6%)</td>
</tr>
<tr>
<td>U.S.</td>
<td>$49.4 billion (72%)</td>
</tr>
<tr>
<td>Michigan</td>
<td>$18.0 billion (26% of North America)</td>
</tr>
<tr>
<td>Mexico</td>
<td>$14.8 billion (22%)</td>
</tr>
</tbody>
</table>

Total North American Investment Announcements: $68.5 billion

Source: CAR “Book of Deals”
New mobility services are enabled by emerging technologies and wireless connectivity that allow for more convenient, efficient, and flexible travel.
Effects on Light Vehicle Sales

Net loss of new and used vehicle sales due to carsharing, 2010 to 2021

<table>
<thead>
<tr>
<th>Region</th>
<th>Annual Average</th>
<th>Total (2010 to 2021)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>15,163</td>
<td>164,606</td>
</tr>
<tr>
<td>United States</td>
<td>12,663</td>
<td>137,507</td>
</tr>
<tr>
<td>Europe</td>
<td>28,844</td>
<td>267,533</td>
</tr>
<tr>
<td>Asia - Oceania</td>
<td>49,213</td>
<td>398,712</td>
</tr>
<tr>
<td>Total</td>
<td>93,220</td>
<td>830,850</td>
</tr>
</tbody>
</table>

In North America, 41 percent of carsharing members affirm they have foregone or postponed a vehicle as a result of using a carsharing service.

In Europe, 32 percent...

In Australia, 28 percent...

In 2021, one carsharing vehicle will replace 7.7 private vehicles in North America, 4 private vehicles in Europe, and 3.8 private vehicles in Asia - Oceania.
The Economic Implications of Potential NHTSA and EPA Regulatory Revisions on U.S. Light Truck Sales and Manufacturing
## U.S. Light-duty Truck CAFE Targets and 2015 Model Year Pickup Truck Performance Without Credits (Share of Pickup Truck Sales)

<table>
<thead>
<tr>
<th>68.5% DO NOT MEET 2015 STANDARD</th>
<th>18.5% MEET ONLY THE 2015 STANDARD</th>
<th>7.7% MEET 2016-2019 STANDARDS</th>
<th>5.3% MEET 2020-2023 STANDARDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>53 ≤ X &lt; 56</td>
<td>56 ≤ X &lt; 62</td>
<td>62 ≤ X &lt; 66</td>
<td>66 ≤ X &lt; 70</td>
</tr>
<tr>
<td>56 ≤ X &lt; 62</td>
<td>62 ≤ X &lt; 66</td>
<td>66 ≤ X &lt; 70</td>
<td>70 ≤ X &lt; 72</td>
</tr>
<tr>
<td>62 ≤ X &lt; 66</td>
<td>66 ≤ X &lt; 70</td>
<td>70 ≤ X &lt; 72</td>
<td>72 ≤ X &lt; 77</td>
</tr>
<tr>
<td>66 ≤ X &lt; 70</td>
<td></td>
<td>72 ≤ X &lt; 77</td>
<td></td>
</tr>
<tr>
<td>70 ≤ X &lt; 72</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>72 ≤ X &lt; 77</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 68.5% do not meet 2015 standard
- 18.5% meet only the 2015 standard
- 7.7% meet 2016-2019 standards
- 5.3% meet 2020-2023 standards

Source: (U.S. Environmental Protection Agency, 2016); Center for Automotive Research analysis
U.S. Light Truck Sales Move in Step with N.A. Profits
Ford and GM Combined North American Profits and Combined U.S. Light Truck Sales, Q3 2009 – Q1 2016

Source: (Ford Motor Company, 2016) (General Motors Company, 2016) (LMC, 2016)
What is at stake if they don’t?
Economic Contribution of U.S. Body-on-Frame Truck Manufacturing, 2015

<table>
<thead>
<tr>
<th>Economic Impact</th>
<th>U.S. Body-on-Frame Truck Manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMPLOYMENT</td>
<td></td>
</tr>
<tr>
<td>Direct</td>
<td>84,200</td>
</tr>
<tr>
<td>Intermediate</td>
<td>437,300</td>
</tr>
<tr>
<td>Subtotal (Direct + Intermediate)</td>
<td>521,500</td>
</tr>
<tr>
<td>Spin-Off</td>
<td>821,400</td>
</tr>
<tr>
<td>Total (Direct + Intermediate + Spin-off)</td>
<td>1,342,900</td>
</tr>
<tr>
<td>MULTIPLIER</td>
<td></td>
</tr>
<tr>
<td>(Direct+Intermediate+Spin-off)/Direct*</td>
<td>15.9</td>
</tr>
</tbody>
</table>

TOTAL EARNINGS BY PLACE OF WORK, PRIVATE NON FARM ($ BILLIONS NOMINAL)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Less: Contributions for Government Social Insurance</td>
<td>$10.51</td>
</tr>
<tr>
<td>Less: Personal Current Transfer Receipts</td>
<td>$3.69</td>
</tr>
<tr>
<td>Less: Personal Income Taxes</td>
<td>$12.36</td>
</tr>
<tr>
<td>Equals Private Disposable Personal Income ($ Billions Nominal)</td>
<td>$71.90</td>
</tr>
</tbody>
</table>

CONTRIBUTION AS % OF TOTAL PRIVATE ECONOMY

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment</td>
<td>0.82%</td>
</tr>
<tr>
<td>Compensation</td>
<td>1.06%</td>
</tr>
</tbody>
</table>

Source: Center for Automotive Research analysis
Conclusions

• Known Knowns
  – U.S. auto sales are in the 7th year of a recovery in a highly cyclical industry—and what goes up, must come down
  – U.S. production involves global companies, using global platforms, and relying on global supply chains
  – Consumer acceptance of mobility services and automated driving features is high
  – EU, China and other regulators will move forward with FE/GHG regulations
  – Michigan and Michigan-based companies rely on “truck” production and sales

• Known Unknowns
  – When will the economy tip into recession? Will it be global? How deep will it be?
  – What will President-Elect Trump do to fulfill his promise to get tough on trade? Will others retaliate?
  – If Trump disrupts NAFTA or trade with China, how will automakers & suppliers respond—relinquish in U.S., relocate to other low cost countries, or lie low and wait out the 4 (8?) years of this presidency?
  – What will be the impact of increasingly automated → autonomous vehicles on auto sales & production?
  – What will be the impact of new mobility business models on the auto industry?
  – Will Trump’s EPA and NHTSA pull back from FE/GHG regulations?
  – Is the EIA forecast on future low fuel prices correct?

• Unknown Unknowns
  – ???