Automotive Outlook

2016 FTA Revenue Estimation & Tax Research Conference

October 17, 2016

Kim Hill, President
Outlook generally good

- Sales up in September
- Should be very close or exceed 2015’s all-time record sales
- Used vehicles may become more appealing soon
- Extended finance terms and high lease rates underscore industry’s willingness to assist buyers in getting a new vehicle
- Incentives climbing higher
- Truck-type products are selling well—high margins
- Car-type products being moved out of country—low margins, difficult to build profitably in U.S.
U.S. Sales growing(?)...slowly...or not?

Source: Automotive News, Words Automotive, HWA
U.S. Light Vehicle Sales
Percent Change YTD Through September:  2016 vs. 2015

<table>
<thead>
<tr>
<th>Category</th>
<th>2016 Change</th>
<th>2015 Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>-8.2%</td>
<td>7.7%</td>
</tr>
<tr>
<td>Light Trucks</td>
<td>-8%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Passenger Cars</td>
<td>-10%</td>
<td>-8%</td>
</tr>
</tbody>
</table>

Source: Automotive News
Percent Change in Sales of Light Vehicles Per OEM:
YTD Through September: 2016 vs. 2015

<table>
<thead>
<tr>
<th>OEM</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL LV Sales</td>
<td>0.5%</td>
</tr>
<tr>
<td>Nissan</td>
<td>5.4%</td>
</tr>
<tr>
<td>FCA</td>
<td>4.5%</td>
</tr>
<tr>
<td>Honda</td>
<td>3.3%</td>
</tr>
<tr>
<td>Hyundai-Kia</td>
<td>1.6%</td>
</tr>
<tr>
<td>Ford</td>
<td>0.6%</td>
</tr>
<tr>
<td>Toyota</td>
<td>-2.4%</td>
</tr>
<tr>
<td>GM</td>
<td>-3.8%</td>
</tr>
</tbody>
</table>

Source: Automotive News;
U.S. Vehicle Production remains steady

Source: Wards, Auto News
U.S. Employment tied to production

It’s not what it used to be—now, more production, fewer workers

<table>
<thead>
<tr>
<th>Year</th>
<th>Vehicle Production</th>
<th>Automotive Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>11,100,000</td>
<td>686,100</td>
</tr>
<tr>
<td>2014</td>
<td>11,600,000</td>
<td>736,000</td>
</tr>
<tr>
<td>2015</td>
<td>12,000,000</td>
<td>760,000</td>
</tr>
<tr>
<td>2016</td>
<td>12,300,000</td>
<td>780,000</td>
</tr>
<tr>
<td>2017</td>
<td>12,100,000</td>
<td>760,000</td>
</tr>
<tr>
<td>2018</td>
<td>12,100,000</td>
<td>760,000</td>
</tr>
</tbody>
</table>

Source: Automotive News, BLS, HWA
U.S. Market Share 2000 – 2016 YTD

It's about retaining market share to continue to earn profits

Source: Automotive News; HWA Research

HWA Analytics LLC
Ann Arbor, Michigan
Some strength still in sales growth, but may not eclipse last year’s all-time record sales

Source: Automotive News
Sales Are Back

Both Spending and vehicle sales exceed 2006 level

Bubble economy helped sales 99-06; recession took wind out 08-10; post recession growth and efficiencies 11-present

Source: BEA, Table 7.2.6B. Real Motor Vehicle Output, Chained Dollars
Sales are back: Motor Vehicle Sales Index (2000 = 100)

Indexed against 2000 (record year at time), sales are just below, but revenues far surpass—with fewer workers...
### 2016 U.S. Sales Forecasts (millions)

<table>
<thead>
<tr>
<th>Source</th>
<th>Forecast</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAR</td>
<td>17.5</td>
<td>(9/16)</td>
</tr>
<tr>
<td>Kelley Blue Book</td>
<td>17.6</td>
<td>(9/16)</td>
</tr>
<tr>
<td>NADA</td>
<td>17.7</td>
<td>(8/16)</td>
</tr>
<tr>
<td>TRUECAR</td>
<td>17.4</td>
<td>(9/16)</td>
</tr>
<tr>
<td>WARDS AUTO</td>
<td>17.5</td>
<td>(9/16)</td>
</tr>
<tr>
<td>GLOBAL INSIGHT</td>
<td>17.5</td>
<td>(9/16)</td>
</tr>
<tr>
<td>LMC</td>
<td>17.4</td>
<td>(9/16)</td>
</tr>
</tbody>
</table>

**Sources:** Various
Low gas price affecting mix

- Sales of trucks and other vehicles in relation to gas prices
- Sales of EVs impacted
Gasoline Prices (Real)
January ‘03 – Aug. ‘16

Source: EIA
U.S. Light Vehicle Sales By Cars and Trucks and Real Gas Prices

Source: EIA and BEA
Average End User Gasoline Prices per Gallon (USD)

<table>
<thead>
<tr>
<th>Country</th>
<th>Gas/No Tax</th>
<th>Average Tax</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>$2.22</td>
<td>$3.06</td>
</tr>
<tr>
<td>Canada</td>
<td>$0.42</td>
<td>$1.17</td>
</tr>
<tr>
<td>Japan</td>
<td>$1.79</td>
<td>$2.12</td>
</tr>
<tr>
<td>Spain</td>
<td>$2.20</td>
<td>$2.87</td>
</tr>
<tr>
<td>France</td>
<td>$2.24</td>
<td>$3.66</td>
</tr>
<tr>
<td>Germany</td>
<td>$2.02</td>
<td>$3.74</td>
</tr>
<tr>
<td>UK</td>
<td>$2.03</td>
<td>$4.00</td>
</tr>
<tr>
<td>Italy</td>
<td>$1.81</td>
<td>$4.13</td>
</tr>
</tbody>
</table>

*Total not matching sum of Gas/No Tax and Average Tax due to rounding errors
Source: Energy Information Administration, International Energy Agency
Market Share: Segment Breakdown
U.S. Light Vehicles Sales
August YTD 2016

Note: Electrified Segment consists of BEVs, HEVs and PHEVs; all other segments are sales exclusive of Hybrid models

Source: Ward’s Automotive Reports, HybridCars.com
Segment Breakdown
U.S. Light Vehicles Sales Percent Change
August YTD: 2016 vs. 2015

Note: Electrified Segment consists of BEVs, HEVs and PHEVs; all other segments are sales exclusive of Hybrid models

Source: Ward’s Automotive Reports, HybridCars.com
**Market Share of U.S. Electrified Light Vehicle Sales and Selected OEM Share of U.S. Electrified Sales August YTD 2016 vs. August YTD 2015**

<table>
<thead>
<tr>
<th>Total LV Sales</th>
<th>2015 YTD</th>
<th>2016 YTD</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015 YTD</td>
<td>2.8%</td>
<td>2.6%</td>
</tr>
<tr>
<td>2016 YTD</td>
<td>14.3%</td>
<td>15.6%</td>
</tr>
</tbody>
</table>

**Note:** Electrified Light Vehicles consist of BEV, HEV, and PHEV

**Source:** Wards Automotive Reports, HybridCars.com
U.S. GDP Growth Rate and Vehicle Sales Growth Rate
1956 – 2Q 2016

Source: Bureau of Economic Analysis
Top 10 Sectors for Year-over-Year Manufacturing Production Growth (Aug. 2015 to Aug. 2016)

Motor Vehicles and Parts
Miscellaneous Durable Goods
Chemicals
Nonmetallic Mineral Products
Furniture and Related Products
Food, Beverages and Tobacco
Electronic Equipment and Appliances
Plastics and Rubber Products
Printing and Support
Apparel and Leather

Source: Federal Reserve Economic Research and Data, G.17 Industrial Production and Capacity Utilization, Market and Industry Group Summary
U.S. Housing Starts and Auto Sales

Since Q3 2007, housing starts and auto sales have been in lockstep...

Source: American Housing Survey for the United States, U.S. Census Bureau; BEA, HWA analysis
Changes from Jan ’07: CPI-New Vehicle and CPI-Used Vehicle

Source: BLS

Time to look at a used vehicle? Could affect new sales—look for increased incentives.
Households Are Carrying More Debt*

Debt in Billion $

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Student Loans</th>
<th>Auto Loans</th>
<th>Credit Card</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Q 2003</td>
<td></td>
<td></td>
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<tr>
<td>1Q 2004</td>
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<td>1Q 2005</td>
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<td>1Q 2006</td>
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<td>1Q 2007</td>
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<td>1Q 2008</td>
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<td>1Q 2009</td>
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<td>1Q 2010</td>
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<td>1Q 2011</td>
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<td>1Q 2012</td>
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<td>1Q 2015</td>
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<tr>
<td>1Q 2016</td>
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</tr>
</tbody>
</table>

*Excludes mortgage and home equity line of credit

Source: FRBNY Consumer Credit Panel/Equifax

Something has to give—how many people will choose to give up the car?
Auto Getting Crowded Out? Household Monthly Expenditure

What is Discretionary?

Source: Personal Consumption Expenditures by Type of Product, Bureau of Economic Analysis; U.S. Census
Weighted Average New Car Loans Maturity
1971 – 2Q 2016

Source: Federal Reserve Economic Research and Data, G.19 Consumer Credit
They are Getting Old . . .
U.S. Light Vehicle Age and Vehicle Scrappage Rate*

<table>
<thead>
<tr>
<th>Year</th>
<th>Average Age</th>
<th>Scrappage Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>8.6</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>8.8</td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td>8.8</td>
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<tr>
<td>2000</td>
<td>8.9</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>9.0</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>9.1</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>9.4</td>
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<td>2004</td>
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<td>2005</td>
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<td>2006</td>
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<td>2007</td>
<td>10.0</td>
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<td>2008</td>
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<td>2011</td>
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<tr>
<td>2012</td>
<td>11.4</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>11.5</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>11.5</td>
<td></td>
</tr>
</tbody>
</table>

*Vehicle scrappage rate includes heavy duty trucks and buses.
Data as of July 1 each calendar year prior to 2009. Data as of Oct. 1 for 2009 and as of Dec. 31 for 2010 and after.
Source: IHS Automotive via Ward’s Motor Vehicle Facts and Figures
U.S. Principal Means of Transportation to Work 89&14

1989
- Automobile: 87%
- Public Transportation: 5%
- Bicycle and Motorcycle: 1%
- Walks Only: 3%
- Work At Home: 2%
- Other: 1%

2014
- Automobile: 86%
- Public Transportation: 5%
- Bicycle and Motorcycle: 1%
- Walks Only: 3%
- Work At Home: 4%
- Other: 2%

U.S. Department of Commerce, American Community Survey, 2011, U.S. Census Bureau
Auto Manufacturing—That was then....

TOTAL Michigan Automotive Industry: 250,000 Employees, 4,500 Establishments

Employment

0 20,000 40,000 60,000 80,000 100,000 120,000

Engineering Services
TOTAL Michigan Automotive Industry: 250,000 Employees, 4,500 Establishments
Other Parts
Metal Stamping
Seating/Interior Trim
Brake Systems
Steering/Suspension
Electric Equipment
Powertrain
Gasoline Engine/Parts
Assembly

Coating, Engraving & Heat Treating
Machine Shops & Threaded Product
Forging & Stamping
Nonferrous
Ferrous
Tool/Die/Mold/ Jig/Fixture
Metal Stamping

332 Fabricated Metal
331 Foundaries
3335 Metalworking Machinery
3363 Motor Vehicle Parts & Components
3361 Motor Vehicle Manufacturing

What is Auto Manufacturing?
Automotive Employment and Establishments in Michigan

- America’s automakers are among the largest purchasers of raw materials such as aluminum, copper, iron, lead, plastics, rubber, textiles, vinyl, steel and computer chips. Additionally, the industry has a significant influence on many other sectors, such as:
  - Computers and semi-conductors,
  - Professional and Technical Services
  - Administration and Services
  - Wholesale Trade
  - Retail Trade
  - Transportation and Warehousing
  - Finance and Insurance
  - Management of Companies
  - Legal
  - Vehicle IT Platforms
  - Advanced driver assistance systems
  - Dedicated short range communications
  - Autonomous vehicle operating systems
  - Collision avoidance
  - Connected vehicle services
  - Connected vehicle ecosystem
  - Navigation
  - Systems integration
  - Information technologies
  - Passive safety

- Sensors
- Proximity sensors
- Microprocessors
- Embedded processors
- Testing services
- Software systems
- Artificial intelligence
- Deep learning
- Autonomous cars
- Haptic touch control
- Haptic feedback technology
- Gesture and motion detection systems
- Human-machine interface—HMI
- Speech recognition technology—Machine learning
- After-market autopilot systems
- Radar
- Lidar—light-based radar
- GPS
- EV charging systems
- Antenna systems
- Onboard communications
- Computer vision systems
- Vehicle cameras
- Simulation systems


HWA Analytics LLC
Ann Arbor, Michigan
OEM-Tech Partnerships

Apple—invested $1 billion in Didi (ride-hailing app)
Audi—Qualcomm, Nvidia
Baidu—Chinese search giant and BMW
BMW—Intel, Mobileye, Moovit, Scoop, Zendrive, Zirx, Baidu, Nvidia
Daimler Truck, Volvo Truck, DAF, Iveco, Scania, MAN—truck platooning
Daimler—subsidiary, Moovel acquired MyTaxi, acquired RideScout
Delphi—self-driving technology in an Audi
Ford—Smart Mobility Plan (no details yet), rumored partnering with Google
GM—Lyft, Cruise Automation, Carnegie-Mellon
Google—FCA: test fleet to include 100 Pacifica minivans
Honda—Nvidia, no formal partner announced yet
Hyundai—no partner named yet, focusing on AI, connectivity, and autonomous
Jaguar-Land Rover—autonomous, no partner named
Mercedes—autonomous technology, partnering with Nvidia
Microsoft—Volvo (autonomous vehicle R&D), Toyota (robotics, AI, self-driving vehicle)
Nissan/Renault—Toyota (intelligent maps), autonomous vehicles
Nvidia—computing platform for autonomous vehicles, partnering with Audi, Tesla, Mercedes, Volvo, Honda, BMW, Fiat, and others
PSA Group (Peugeot, Citroen, and DS)—autonomous and near-autonomous
Tata Elixsi (division of TATA group)—autonomous parking valet
Tesla—autonomous vehicles, severed ties with Mobileye, potentially acquiring SolarCity, Nvidia
Toyota—autonomous vehicles, partnering with Stanford, MIT, University of Michigan, Microsoft, Nissan/Renault, Uber (undisclosed investment)
Uber—autonomous vehicles, mapping technology, partnering with Carnegie-Mellon, University of Arizona, acquired deCarta (mapping startup) and mapping assets from Microsoft, has retrofitted Ford Fusions (unclear if Ford is participating)
VW—autonomous research, ride sharing (with Gett—$300 million)
Volvo—autonomous vehicles, partnering with Microsoft, looking at “various partnerships”, Nvidia
Contributions

- Nationally, 6-8 multiplier—entire company/industry
- Assembly plant—10 or higher
- In-state, between 3-5 multiplier (automotive states—14)
- $500 billion compensation, $70 billion tax revenue, nationally
- Jobs supported throughout entire economy—direct, indirect and induced
One assembly plant spends a lot of $$
## Total of All Estimated Taxes and Fees, 2013

<table>
<thead>
<tr>
<th>Tax Category</th>
<th>State ($M)</th>
<th>Federal ($M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales Tax Revenues (§ Millions)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Vehicles</td>
<td>21,997</td>
<td></td>
</tr>
<tr>
<td>Used Vehicles</td>
<td>12,084</td>
<td></td>
</tr>
<tr>
<td>Parts/Services</td>
<td>4,831</td>
<td></td>
</tr>
<tr>
<td>Use Tax Revenues (§ Millions)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel</td>
<td>40,135</td>
<td>36,000</td>
</tr>
<tr>
<td>Title/Registration</td>
<td>23,304</td>
<td></td>
</tr>
<tr>
<td>Driver License</td>
<td>2,513</td>
<td></td>
</tr>
<tr>
<td>Business Taxes (§ Millions)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturers</td>
<td>762</td>
<td></td>
</tr>
<tr>
<td>Dealerships</td>
<td>995</td>
<td></td>
</tr>
<tr>
<td>State and Local Employee Personal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income Taxes (§ Millions)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automaker</td>
<td>1,352</td>
<td>21,883</td>
</tr>
<tr>
<td>Supplier</td>
<td>1,192</td>
<td>20,485</td>
</tr>
<tr>
<td>Dealer</td>
<td>1,108</td>
<td>18,332</td>
</tr>
<tr>
<td>ALL TAXES PAID TO GOVERNMENT (§ Millions)</td>
<td>$110,273</td>
<td>$96,700</td>
</tr>
</tbody>
</table>

% AUTO

The production, sale, maintenance, and use of an automobile contribute to state coffers.
Shift in manufacturing

- Most new investments occurring at existing plants in U.S.—and now Canada
- Major MX investments-10 new announced—and counting
- Ontario, Canada mixed bag: currency exchange, higher wages, tough union, distance—recently agreements with FCA, GM could improve situation
- Retention of existing facilities becomes main priority in states across the country and in Canada
- U.S. plants building trucks, vans, SUVs, CUVs, are in solid position. Car plants are losing their product (CR-V to Indiana-out of MX; Chrysler 200, Liberty to go away—move RAM, more Wrangler, Cherokee; Focus to MX—Ranger, Bronco to arrive; additional Silverado final stage mfg. to Oshawa—more room at Ft. Wayne
- More new investment, more production of high margin vehicles, more revenues for auto companies, less workers...
A Look Forward

• Auto sales rebounded in September—where to next?
• Mexico is a big play
  – Major investment in vehicle production facilities
  – FCA moving small, less profitable vehicles there, large trucks etc., into U.S.
  – Ford moving Focus out of MI to MX, GM Sonic next?
• Canada/union is trying to push back
  – Subsidize new investment in existing facilities—contracts ratified with GM, FCA
• Alternative fuel vehicles are tough sell
  – Without stiff regulations, mandates
  – Less than $2.50/gal gas
• Market plateau above 17 million annual units leaves plenty of room for success
• Big profit vehicles remain in U.S.
• Some manufacturers are already relying heavily on incentives and or fleet sales, which don't bode well long term
Thank you

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