CAR Management Briefing Seminars

The Quandary of Two Automotive Markets: Today and Tomorrow

Jeff Schuster, LMC Automotive
August 2017
• Today – Navigating the Here and Now with Mid-term Prospective

• Tomorrow – Planning for Uncharted Future Mobility

• Summary – Finding Balance
Global Light Vehicle Climate
Global LV Sales Poised for 8th Year of Growth

2017 forecast up 2.0mn units to 95.0 mn, with all major regions showing positive growth except North America. Outlook momentum since January is mixed bag!

Source: LMC Automotive
Global LV Sales Short-term Outlook

- Short-term outlook remains positive through horizon – Volume up 6% or 2.1% CAGR.
- Growth expected to slow slightly in 2018 (1.7%).
  - Tax break easing in China.
  - Past peak in US?
  - Brexit/political risk in Europe.
- Growth returns to 2.6% in 2019.

- Rate of growth is heavily dependent on China demand (3.1mn units).
- 3 of top 12 countries are negative contributors, with marked risk across others.
- India, Russia and Iran add 2.5mn of volume growth collectively.

Source: LMC Automotive
Locally made PV sales growth saw a strong rebound stimulated by tax cut incentives in 2016. Pull ahead impact and reduced incentive caused weaker H1.
China Car Market Outlook

Global Financial Crisis; Stimulus Package; Payback Effect

Inventory Change; Car Purchasing Restrictions; Economic Adjustments & “Mini” Stimulus

50% of tax cut extends through 2017, offsetting some payback – growth slows

Source: LMC Automotive
• Volume growth spiked in 2H16, with year up 4.7% on strong growth in China due to boost in demand from tax cut – further recovery expected in Russia/Brazil. 2017 growth still slows to 2.4% on some weakness in NA.

• ROW driven by growth in Iran (21%) and Morocco (17%). Production In Iran could face risks.

• Growth slows in WE with volume up marginally, while Central and Eastern Europe sees growth restarting, including recovery in Russia (+9%). Brazil also expected to start recovery in 2017, up 8%, but remains risky. Contraction now expected in NA.
Capacity utilization improves overall but with previous investment in emerging markets, it is sub-optimal.

- Growth in demand slows – if any investment in US, closures likely to result elsewhere.
- China remains well underutilized with old factories remaining after newer capacity push.
- Reduction in Japan/Korea improves utilization; much of SA investment to remain unused!

Source: LMC Automotive
SUVs to Gain More Ground in all Markets

SUV market share (of LVs), major markets

Number of SUV models in production globally

Source: LMC Automotive
Global volume leadership very close in 2017 between VW, Toyota and R-N: VW Group most likely to come out on top, but R-N (incl. Mitsubishi) has 1H lead!

Source: LMC Automotive
North America Prospective
How Healthy is the Auto Industry?

YTD17 Vs. YTD16 – Indicators showing risk, but slowly improving
Total Light Vehicle Volume -2.3%, Retail Sales Volume -0.6%

- **Retail Mix**
  - 79.5%
  - +1.3ppt

- **Lease Mix**
  - 30.4%
  - -1.0ppt

- **72mo + Loan Mix**
  - 34.3%
  - +1.9ppt

- **FICO Sub-650 Mix**
  - 14.8%
  - -1.6ppt

- **Days to Turn**
  - 69
  - +4 days

- **Lease Maturities**
  - 1,707k
  - +14%

- **Trans Price**
  - $31,388
  - +1.3%

- **Incentive % of MSRP**
  - 10.3%
  - +0.9ppt

Source: JDP PIN
US Auto Industry Performance

1H Industry Sales

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Retail</th>
<th>Fleet</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>5.0%</td>
<td>5.8%</td>
<td>1.59</td>
</tr>
<tr>
<td>2015</td>
<td>4.5%</td>
<td>3.2%</td>
<td>1.74</td>
</tr>
<tr>
<td>2016</td>
<td>1.5%</td>
<td>-0.6%</td>
<td>1.91</td>
</tr>
<tr>
<td>2017</td>
<td>-2.3%</td>
<td>-0.6%</td>
<td>1.75</td>
</tr>
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</table>

Annual Industry Sales

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>5.9%</td>
<td>5.6%</td>
</tr>
<tr>
<td>2015</td>
<td>5.8%</td>
<td>5.1%</td>
</tr>
<tr>
<td>2016</td>
<td>0.5%</td>
<td>-0.8%</td>
</tr>
<tr>
<td>2017</td>
<td>-3.0%</td>
<td>-2.2%</td>
</tr>
</tbody>
</table>

- **1H17 SAAR Average 16.9mn down from 17.2mn last year – 2H17 expected at 17.1mn from 17.8mn.**
- **Fleet sales off 6.2% in 1H and volume expected down 4.7% in 2H ending at 18.7% of industry from 19.4% in 2016.**
- **Retail sales only down 0.6% in 1H but will face pressure from 2H strength in 2016, expect decline of -3.6% in 2H17 on one less selling day.**

Source: LMC Automotive, JDP PIN
Finding the Production Balance

NA Production

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weeks (July)</td>
<td>17.8</td>
<td>17.7</td>
</tr>
<tr>
<td>Changeover/Upgrades</td>
<td>-0.6%</td>
<td></td>
</tr>
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Summer Plant Shutdowns Increase, But...

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2017</th>
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</thead>
<tbody>
<tr>
<td>Weeks (July)</td>
<td>74</td>
<td>99</td>
</tr>
<tr>
<td>Changeover Down Weeks</td>
<td>73</td>
<td>76</td>
</tr>
<tr>
<td>Supply Down Weeks</td>
<td>1</td>
<td>23</td>
</tr>
</tbody>
</table>

Inventory remains on watch as Days’ Supply is up 8 days over 2016, with 400k more unsold vehicles. Risk in H2 with additional down weeks possible. Additional shutdown risk greatest in Q4 as expectations may meet reality!

Source: LMC Automotive
US Product Activity Remains High

US - Flat to Falling!

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>New Entry</td>
<td>18</td>
<td>25</td>
<td>23</td>
<td>25</td>
<td>39</td>
<td>25</td>
<td>11</td>
</tr>
<tr>
<td>Redesign</td>
<td>23</td>
<td>20</td>
<td>29</td>
<td>37</td>
<td>46</td>
<td>36</td>
<td>35</td>
</tr>
<tr>
<td>Facelift</td>
<td>36</td>
<td>38</td>
<td>39</td>
<td>32</td>
<td>36</td>
<td>55</td>
<td>53</td>
</tr>
<tr>
<td>Drop</td>
<td>7</td>
<td>17</td>
<td>38</td>
<td>5</td>
<td>6</td>
<td>8</td>
<td>4</td>
</tr>
</tbody>
</table>

- Fragmentation and competition increases going forward – SUVs, HEV/EVs are a priority.
- 123 new entries from 2017 forward, with 183 redesigns planned.
- Model Count increases from 360 in 2016 to over 400 by 2020!

Source: LMC Automotive
US Product Mix Following Demand...

% Mix of #Entries in Market

SUV market share up 10ppt from 37% in 2015 to 47% in 2021; product activity skewed on premium side.

Market share of cars down 11ppt from 39% in 2015 to 28% in 2021 as # of entrants fall.

Pickups gain 2ppt of share from 2015 capturing 16% of market in 2021.

Source: LMC Automotive
Baseline – Flat post peak
• CAGR ‘16-24 of 0% (flat).
• + and – variable offset.
• + = economy, replacement, new households.
• - = used car prices, tighter credit, trade/fiscal policy uncertainty.

Negative – Mild auto recession
• Volume drops 8% from base to 15.4mn in 2019 – CAGR -0.4%.
• No fiscal stimulus boost and negative trade policy.
• Used car interplay more severe, economy flat or slightly negative.
• Recovery hampered by lower density growth.

Outperform – Two-staged boost
• CAGR only 0.3%.
• Near-term boost from fiscal stimulus and lease maturities.
• Stronger than expected economic growth.
• Technology driven increase in mid-term as market transitions.

Source: LMC Automotive
• The demand shift toward SUVs drives rapid change in wave 2 of SUVs. SUV output in Mexico grows by over 200% (mostly Small and Compact), while US build gains 13% w/Midsize leading growth.

• Car production drops on slowing demand, resourcing outside NA and likely cancellations. US output hit hardest (-23% expected) leaving some Car-centric plants at risk. Mexico gains 12% with new plant resourcing and exports.

• Pickup build is stable, aided by new Midsize entries and consistent Large Pickup demand.
Detroit 3 NA Plants – Are There Too Many?

Detroit 3 NA Plant Utilization

Source: LMC Automotive
Today – Navigating the Here and Now with Mid-term Prospective

Tomorrow – Planning for Uncharted Future Mobility

Summary – Finding Balance
Will Disruptors Engaged in Disruption be Disrupted by...Reality?
World of Mobility is Coming, but When?

- Connected
- Autonomous
- Electrification
- Shared
Ownership Growing on the Traditional Model

But what happens if ownership patterns change because of new mobility solutions?

Global LV Demand

<table>
<thead>
<tr>
<th>Year</th>
<th>LV Sales CAGR Last 15 Yrs.</th>
<th>2016-2024 LV Sales CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>66.3</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>93.1</td>
<td></td>
</tr>
<tr>
<td>2024</td>
<td>111.7</td>
<td></td>
</tr>
</tbody>
</table>

Source: LMC Automotive
New mobility trends do not come quickly enough to change growth dynamic.

With sales approaching 100mn units/year, a rising parc is inevitable – scrappage rising from ~50mn units/year now to 60mn units/year.

Growth focused in emerging markets, with fleet levels growing very slowly, if at all, in mature markets.

Aftermarket opportunity expands, but adds complexity for introduction of sharing alternatives and autonomous vehicles later on.

Source: LMC Automotive; LMC International
Preparation For The Future – Premiums Lead The Way

Electrifying SUVs

Premium brands continue to offer more EV SUVs than traditional brands

<table>
<thead>
<tr>
<th>Year</th>
<th>Premium</th>
<th>Traditional</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>56%</td>
<td>44%</td>
</tr>
<tr>
<td>2016</td>
<td>56%</td>
<td>44%</td>
</tr>
<tr>
<td>2017</td>
<td>63%</td>
<td>38%</td>
</tr>
<tr>
<td>2018</td>
<td>60%</td>
<td>40%</td>
</tr>
<tr>
<td>2019</td>
<td>54%</td>
<td>46%</td>
</tr>
<tr>
<td>2020</td>
<td>54%</td>
<td>46%</td>
</tr>
<tr>
<td>2021</td>
<td>52%</td>
<td>48%</td>
</tr>
</tbody>
</table>

Source: LMC Automotive
Connected Vehicles in Various Modes

Connectivity is a critical enabler for improved shared services and, ultimately, for Avs.

Vehicles will increasingly communicate with surroundings:
- Other vehicles
- Infrastructure
- Other road users (cyclist, pedestrian)
- Internet

Leading to New Services:
- Safety
- Infotainment
- Traffic Management
- Vehicle Diagnostics

Issues:
- **Today's Environment** – System implementation have significant lead time – New V2V likely start.
- **Lack of Standards** – Agreement on standards internationally is critical for widespread adoption, and for successful implementation.
- **Mobile Network** – Lack of completeness in mobile network coverage is an issue.
- **Security and Privacy** – Remains a significant threat to acceptance.

Source: LMC Automotive
Mobility Services Are Not New

- Deeply integrated shared forms of transportation have been around for decades and are used by vast numbers of people on a regular basis.

- New mobility solutions now compete, while some may integrate further.

- Increased connectivity of vehicles within new mobility (shared) offerings may increase the effectiveness of their connection to consumers.

- App-based ordering and booking also increases ease of use.

- But the change is not really transformative: it appears to be additive in terms of choice and capacity.

Source: LMC Automotive
Shared Models Continue to Advance but ...

... are not proving a major threat to volume

- Various models now operating across the world with heavy focus on densely populated areas.
- Include: ride hailing, ride sharing, car pooling and car sharing.
- Economics of ownership model still wins for almost all users, in most circumstances, and even in cities.
- Current (and near future) shared models mainly offers more choice for consumers and competes with ‘old’ shared models (taxi and public transport).
- The real disruption would be when future automation converges with sharing.

Source: LMC Automotive
But Will They Survive?

Example: Uber’s situation

- Huge and fast-growing revenue – over $9bn in the last four quarters.
- But market domination is proving difficult (e.g. Lyft).
- And enormous losses, at over $3bn in 2016.
- Large cash, and other, reserves (> $9bn) but this won’t last unless the losses can be eliminated.
- General statement: increased size should bring increased scale economies.
- But as Uber grows, its costs grow almost as quickly as the highest proportion of cost is paying drivers (who already complain of lower rates and more difficult working conditions than traditional taxi drivers).
- Other scale advantages should be evident, but will they ever be enough?
- Unless something changes, there is significant risk. Will the largest start-up become a huge financial failure?

Source: LMC Automotive
Full Autonomy Wheel of Challenge

- 3D Mapping
- Road users, other events
- Morality & decisions
- Sensors
- Bad Weather
- Acceptance (Safety)
- Peak Hours Demand
- Expectations Met
- Driver Intervention
- Cost/Price
- Commercial Success
- Cyber Security
- AI
- Legacy Standards
- Legacy Infrastructure
- Connectivity: V2X, Networks
- Privacy
- Legal Issues & Liability
- Insurance

Source: LMC Automotive
**AVs: Advanced Timeline & Impact Consideration**

**2020-25**
- Mass trials Level 4 vehicles.
- AVs have not “arrived” at this point. This is still a part of establishing how they work on a large scale.
- Numbers cannot be huge because of potentially huge expense.
- **Impact:** zero conventional + some new AVs

**2025-30**
- Next stage in development of AVs including learnings from phase I.
- True commercial implementations develop.
- But geographical extension still limited.
- Level 5 vehicles starting.
- **Impact:** minus few mn conventional + new AV sales

**2030-35**
- AV sales globally in 5-10 mn range and rising.
- Substitution starts to hit individual (conventional) ownership model.
- Level 5 vehicles arrived, replacing some Level 4.
- **Impact:** minus several 10s mn conventional + new AV sales.

Source: LMC Automotive
Moderate Progress
- Success in limited areas
- Incremental expansion
- Breakthrough emerges in 2030s
- Conventional flattens, ready for subsequent fall

Transformative
- Technological, commercial, logistical issues solved fairly quickly
- Breakout from first zones to much broader usage
- Transportation boom

Global Light Vehicle Sales (mn)

<table>
<thead>
<tr>
<th>Year</th>
<th>Level-5</th>
<th>Level-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>1.3 mn</td>
<td>4.2 mn</td>
</tr>
<tr>
<td>2021</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2026</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2031</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2036</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Level-5: 1.3 mn
Level-4: 4.2 mn

Slow Burn
- Technical difficulties
- High costs
- Infrastructure delays
- Consumer reluctance

Source: LMC Automotive
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• Tomorrow – Planning for Uncharted Future Mobility

• Summary – Finding Balance
## Summary

<table>
<thead>
<tr>
<th>Expectation</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Near</strong></td>
<td></td>
</tr>
<tr>
<td>Global demand growth is stable with most markets advancing – mature and emerging (Russia/Brazil).</td>
<td>Political risk remains across WE (Brexit) and Brazil Payback from tax incentive expiration in China.</td>
</tr>
<tr>
<td>US demand revised downward but above 17mn – weaker but stable outlook in near-term.</td>
<td>Upside/downside from Trump administration Used car impact is more severe.</td>
</tr>
<tr>
<td>Short-term production in NA now expected to contract with some further inventory risk in H2.</td>
<td>Downtime is already scheduled but could be more pronounced if OEMs don’t balance incentive use.</td>
</tr>
<tr>
<td>North America production volume continues to grow with localization pushing toward 19mn units.</td>
<td>New plant investment is curtailed based on policy Uncertainty around NAFTA decision.</td>
</tr>
<tr>
<td><strong>Far</strong></td>
<td></td>
</tr>
<tr>
<td>Shared economy only destroys a small amount of demand – a fraction of one year’s growth in years.</td>
<td>Volume increase causes price drop; existing convenience barriers are innovated away.</td>
</tr>
<tr>
<td>Automation will create massive change in auto industry, but unlikely to collapse total volume.</td>
<td>Rapid adoption destroys conventional demand more quickly, brings future forward.</td>
</tr>
</tbody>
</table>

Source: LMC Automotive
Thank You

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