THE USED VEHICLE MARKET:
BUMPS ON THE ROAD AHEAD

CHARLES CHESBROUGH
SENIOR ECONOMIST AND SENIOR DIRECTOR OF INDUSTRY INSIGHTS
JUNE 2017
Charles Chesbrough
Senior Economist and Senior Director of Industry Insights
Cox Automotive

Charles is a seasoned quantitative analyst and researcher with over 25 years of experience utilizing data to identify industry trends and opportunities.

Charles joined Cox Automotive recently and is focused on expanding the organization’s research and analysis initiatives, and on the economic and industry outlook.

Charles comes to Cox after working as Chief Economist at OESA, the automotive supplier trade association, and IHS Automotive where he was Director of Industry Analysis and Senior Economist. At IHS, Charles was responsible for developing and integrating statistical models and economic scenarios into IHS global automotive forecasts.

Charles has also worked for Ford Motor Company’s marketing strategy group as well as two technology start-up companies and two market research firms. He began his career as a floor trader at the Chicago Board of Trade.

Charles earned a bachelor’s degree in economics from the College of Business at Michigan State University and a master’s degree in applied economics from the University of Illinois at Chicago. He returned to Michigan State University and completed all courses for the economics PhD program.

Charles has won many economic forecasting accuracy awards and is a board member and former President of the Detroit Association for Business Economics and a member of the National Association for Business Economics, the Federal Reserve Bank Automotive Roundtable, and the Society of Automotive Analysts.
Agenda

• Status of the Used Vehicles
• Market threats and vulnerabilities
• Leasing Karma
New and Used Light Vehicle Registrations

Old used and new fleet is fairly stable – it’s new retail and newer used lifting market to record highs

Registration Volume by Type (12m average)

- Used >6yrs
- Used<=6yrs
- New-Retail
- New-Fleet

Total Registration Volume (12m average)

- Total
- Share Used>6
- Share Used<=6
- Share New Retail
- Share New Fleet

Source: IHS Markit Registrations Data
Used Light Vehicle Sales
YTD sales up over 4%, and Independents gaining share

Used Vehicle Sales (Monthly Actuals)

Used Vehicle Sales (12m Total)

Market Share

Source: NADA Used Vehicle Sales Data
New Light Vehicle Sales
Pace has slowed since Q4 2015, but still on track for a strong year

Monthly Sales (SAAR, millions)

“Keep America Rolling”
“Employee Pricing For All”
“Cash For Clunkers”

Source: Automotive News, US Bureau of Economic Analysis
Economic Growth and New Light Vehicle Sales
Strong relationship historically, but some divergence since 2009 recession

Source: Bureau of Economic Analysis, 4 quarter moving average
Consumer Debt
Total back to pre-recession levels, but now with Student and Auto debt leading the way

Source: New York Fed Consumer Credit Panel/Equifax
Auto Loan Credit Conditions
Availability has been driving the vehicle market recovery; Why? Car buyers pay their bills

Motor Vehicle Loans Outstanding (billion $) | Annual Change

<table>
<thead>
<tr>
<th>Year</th>
<th>Loans Outstanding - L</th>
<th>Annual Change - R</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>$0</td>
<td>-10%</td>
</tr>
<tr>
<td>1999</td>
<td>$200</td>
<td>-5%</td>
</tr>
<tr>
<td>2001</td>
<td>$400</td>
<td>0%</td>
</tr>
<tr>
<td>2003</td>
<td>$600</td>
<td>5%</td>
</tr>
<tr>
<td>2005</td>
<td>$800</td>
<td>10%</td>
</tr>
<tr>
<td>2007</td>
<td>$1,000</td>
<td>15%</td>
</tr>
<tr>
<td>2009</td>
<td>$1,200</td>
<td>20%</td>
</tr>
<tr>
<td>2011</td>
<td>$1,400</td>
<td>20%</td>
</tr>
<tr>
<td>2013</td>
<td>$1,600</td>
<td>15%</td>
</tr>
<tr>
<td>2015</td>
<td>$1,800</td>
<td>10%</td>
</tr>
<tr>
<td>2017</td>
<td>$2,000</td>
<td>5%</td>
</tr>
</tbody>
</table>

S&P/Experian Default Indices

- First Mortgage Default
- Consumer Credit Default
- Auto Loan Default

Source: Federal Reserve Bank, Quarterly Data
Source: Experian, monthly data

Low default rate may explain why auto credit has been so strong since recession.
Agenda

- Status of the Used Vehicles
- Market threats and vulnerabilities
- Leasing Karma
**Auto Loan Credit Quality**

FICO scores stable, but delinquencies starting to rise

**FICO Scores New Originations**

- Median FICO
- 25th Percentile Score
- 10th Percentile Score

**Delinquency Rate (% Accounts 30 days past due)**

- Direct (Bank) Loans
- Indirect (Dealer) Loans

Source: FRBNY Equifax Risk Score, quarterly data, HHDC (household debt and credit) Report

Source: American Banker Association Survey, Moody’s forecast
Auto Loans - Subprime

Delinquencies still below previous peak; Amount of poor credit loans is sizable, and vulnerable

Auto Loan Delinquency Rate (percent)

- 90+ Days Delinquent (FRBNY)
- % of Subprime Delinquent (Liberty St)

Total Subprime Loans (billions)

- Outstanding
- Share of Total
- Annual Growth

Source: Moody's, Federal Reserve Bank New York, Liberty Street quarterly data
Labor Market
Employment conditions strong – concern is that economy doesn’t stay at these levels for long

Source: Department of Labor, Bureau of Labor Statistics
Job Market
5.7 million openings; Quits slowly rising too – workers gaining confidence, wages to follow?

Openings: Jobs Open Per 100 Employed (3m average)

Quits: Jobs Quit Per 100 Employed (3m average)

Job opportunities strong – above 16 year highs – well above pre-recession levels

Quits rising but remain relatively low – eventually will force higher wages to reduce turnover.

Source: Department of Labor, Bureau of Labor Statistics
Labor Market Wages
Wage growth weak since recession; FED watching closely as a potential inflation “spark”

Source: Department of Labor, Bureau of Labor Statistics, Production Non-supervisory

Average Hourly Earnings (monthly)
Annual Change (3m average)

Average Earnings $/hr - L
Annual Change 3m avg - R

Average Annual Wage Growth
1986-2009: 3.2%
2010-2017: 2.1%

Source: Department of Labor, Bureau of Labor Statistics, Production Non-supervisory
Interest Rates
More aggressive tightening likely; FED walking a tightrope to avoid recession

Effective Federal Funds Rate (%, overnight)

Key Interest Rate Forecasts (%)

Source: Federal Reserve Bank

Source: Moody’s current quarterly forecast
Borrowing Conditions Vulnerable
Consumers spending all loan “savings”; Banking survey suggests change is coming

**US Average Amount Financed (new)**

- 4%, 5 year loan of $29K: each 1% increase in rates adds $13 to monthly payment, or $800 total cost.
- Multiple FED rate increases may add $2,000+ over near-term

**Auto Loan Availability**

- Stronger Demand for Auto Loans
- Tighter Standards for Auto Loans

Source: Federal Reserve, Federal Reserve Loan Officer Survey, 4 quarter average
Agenda

• Status of the Used Vehicles
• Market threats and vulnerabilities
• Leasing Karma
Lease and Fleet Share
Bubble forming? High Lease and Fleet will cause problems for residual values, and surge in CPO

Lease and Fleet Share of New LV Registrations

Lease and Fleet Share
Fleet Share

Lease Originations (millions)

Source: IHS Markit, Manheim Consulting
Certified Pre-Owned Vehicle Market
Sales still trending 850K+ each month, but high growth period ending

CPO Vehicle Sales (Monthly Actuals)

CPO Vehicle Sales (12 Month Average)

Annual Change

Source: Autodata Used Vehicle Sales Data
Off-Lease Projections: By Brand
OEM sales strategies will have lasting impact – some more than others

Count of Leased Vehicles by Year of Return

<table>
<thead>
<tr>
<th>Year of Return</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>2,514,898</td>
</tr>
<tr>
<td>2016</td>
<td>3,081,730</td>
</tr>
<tr>
<td>2017</td>
<td>3,591,229</td>
</tr>
<tr>
<td>2018</td>
<td>3,883,644</td>
</tr>
</tbody>
</table>

Source: IHS Markit Estimates
Off-Lease Projections: By Segment
Over 3.5 million units coming back to dealers in 2017 – many are “less desired” cars

Count of Leased Vehicles by Year of Return

<table>
<thead>
<tr>
<th>Year of Return</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>2,514,898</td>
</tr>
<tr>
<td>2016</td>
<td>3,081,730</td>
</tr>
<tr>
<td>2017</td>
<td>3,591,229</td>
</tr>
<tr>
<td>2018</td>
<td>3,883,644</td>
</tr>
</tbody>
</table>

Source: IHS Markit Estimates
New Vehicle Incentives
Spending above recession levels, and pace is accelerating

Average Incentive Spending Per Vehicle (3 month avg)

$4,000
$3,500
$3,000
$2,500
$2,000
$1,500


Light Truck
Pass Car
Industry

Annual Change in Incentive Spending (3 month avg)

30%
20%
10%
0%
-10%
-20%
-30%


Light Truck
Pass Car
Industry

Source: Autodata Incentive Estimates
Light Vehicle Listing Price
New and Used asking prices weakening – only CPO appears stable

Average Listing Price on Autotrader Website

Annual Change in Price

Source: Autotrader Listing Price, Cox Automotive
Vehicle Values
Transaction trends positive on nominal basis but retained values falling

Source: Kelley Blue Book, Dealertrack, Manheim

Average Transaction Price

Average Retained Values (% of MSRP)

Source: KBB Auction Values
Manheim Used Vehicle Value Index
Maintaining upward trend through April, but segments vary significantly

Source: Manheim, monthly, Adjusted for mix, mileage and seasonality
Average Auction Prices
Weakening prices will have impact on residual values, credit availability and profitability

Source: Manheim Consulting
Retained Value of MSRP by Segment
Consumer preferences, incentives, fleeting – all impacting valuations

**MY 2016 Retained Value**

- Luxury High Performance Car: 90.2%
- Mid-size Pickup Truck: 82.7%
- Luxury Sports Car: 79.7%
- High Performance Car: 77.4%
- Luxury Mid-size SUV/Crossover: 74.9%
- Luxury Compact SUV/Crossover: 71.4%
- Sports Car: 70.0%
- Luxury Full-size SUV/Crossover: 69.6%
- High-end Luxury Car: 69.1%
- Mid-size SUV/Crossover: 69.1%
- Full-Size SUV/Crossover: 68.9%
- Van: 66.0%
- Compact SUV/Crossover: 64.8%
- Subcompact SUV/Crossover: 64.3%
- Hybrid/Alternative Energy Car: 63.7%
- Full-size Pickup Truck: 63.1%
- Entry-level Luxury Car: 63.0%
- Minivan: 62.9%
- Compact Car: 60.9%
- Mid-size Car: 58.4%
- Luxury Car: 57.6%
- Full-size Car: 56.7%
- Subcompact Car: 54.8%
- Electric Vehicle: 52.2%

**YOY Point Change**

- Luxury High Performance Car: +6.2%
- Mid-size Pickup Truck: -0.6%
- Luxury Sports Car: -0.1%
- High Performance Car: -6.5%
- Luxury Mid-size SUV/Crossover: -4.1%
- Luxury Compact SUV/Crossover: -1.1%
- Sports Car: -1.6%
- Luxury Full-size SUV/Crossover: -0.3%
- High-end Luxury Car: -0.6%
- Mid-size SUV/Crossover: -4.2%
- Full-Size SUV/Crossover: -6.9%
- Van: +1.3%
- Compact SUV/Crossover: -7.6%
- Subcompact SUV/Crossover: -7.5%
- Hybrid/Alternative Energy Car: +0.5%
- Full-size Pickup Truck: +0.3%
- Entry-level Luxury Car: +0.6%
- Minivan: +1.1%
- Compact Car: +1.8%
- Mid-size Car: +0.9%
- Luxury Car: +1.7%
- Full-size Car: +1.5%
- Subcompact Car: +0.7%
- Electric Vehicle: +1.0%

Source: Cox Automotive - KBB Auction Values
Retained Value of MSRP by Non Luxury OEM
Sales strategies have lasting impact on valuations, and customer loyalties

MY 2016 Retained Value

<table>
<thead>
<tr>
<th>Brand</th>
<th>Retained Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subaru</td>
<td>78.4%</td>
</tr>
<tr>
<td>Honda</td>
<td>72.0%</td>
</tr>
<tr>
<td>Toyota</td>
<td>68.3%</td>
</tr>
<tr>
<td>Jeep</td>
<td>65.9%</td>
</tr>
<tr>
<td>Mazda</td>
<td>64.7%</td>
</tr>
<tr>
<td>GMC</td>
<td>64.1%</td>
</tr>
<tr>
<td>Scion</td>
<td>62.5%</td>
</tr>
<tr>
<td>Ford</td>
<td>61.6%</td>
</tr>
<tr>
<td>Chevrolet</td>
<td>61.7%</td>
</tr>
<tr>
<td>Mini</td>
<td>60.8%</td>
</tr>
<tr>
<td>Kia</td>
<td>59.9%</td>
</tr>
<tr>
<td>RAM</td>
<td>59.0%</td>
</tr>
<tr>
<td>Dodge</td>
<td>59.4%</td>
</tr>
<tr>
<td>Nissan</td>
<td>58.8%</td>
</tr>
<tr>
<td>Volkswagen</td>
<td>58.2%</td>
</tr>
<tr>
<td>Mitsubishi</td>
<td>57.7%</td>
</tr>
<tr>
<td>Hyundai</td>
<td>57.7%</td>
</tr>
<tr>
<td>Chrysler</td>
<td>53.2%</td>
</tr>
<tr>
<td>Fiat</td>
<td>47.1%</td>
</tr>
</tbody>
</table>

YOY Point Change

<table>
<thead>
<tr>
<th>Brand</th>
<th>YOY Point Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subaru</td>
<td>-0.9%</td>
</tr>
<tr>
<td>Honda</td>
<td>-1.3%</td>
</tr>
<tr>
<td>Toyota</td>
<td>-2.1%</td>
</tr>
<tr>
<td>Jeep</td>
<td>-5.9%</td>
</tr>
<tr>
<td>Mazda</td>
<td>-0.8%</td>
</tr>
<tr>
<td>GMC</td>
<td>-4.5%</td>
</tr>
<tr>
<td>Scion</td>
<td>-5.7%</td>
</tr>
<tr>
<td>Ford</td>
<td>-1.0%</td>
</tr>
<tr>
<td>Chevrolet</td>
<td>-3.5%</td>
</tr>
<tr>
<td>Mini</td>
<td>-6.0%</td>
</tr>
<tr>
<td>Kia</td>
<td>-3.3%</td>
</tr>
<tr>
<td>RAM</td>
<td>-3.3%</td>
</tr>
<tr>
<td>Dodge</td>
<td>-5.0%</td>
</tr>
<tr>
<td>Nissan</td>
<td>-7.5%</td>
</tr>
<tr>
<td>Volkswagen</td>
<td>0.3%</td>
</tr>
<tr>
<td>Mitsubishi</td>
<td>0.5%</td>
</tr>
<tr>
<td>Hyundai</td>
<td>-5.5%</td>
</tr>
<tr>
<td>Chrysler</td>
<td>-3.1%</td>
</tr>
<tr>
<td>Fiat</td>
<td>-4.0%</td>
</tr>
</tbody>
</table>

Source: Cox Automotive - KBB Auction Values
Retained Value of MSRP by Luxury OEM
Wide differences among premium manufacturers

<table>
<thead>
<tr>
<th>MY 2016 Retained Value</th>
<th>YOY Point Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Porsche</strong></td>
<td><strong>6.5%</strong></td>
</tr>
<tr>
<td><strong>Land Rover</strong></td>
<td><strong>-3.0%</strong></td>
</tr>
<tr>
<td><strong>Lexus</strong></td>
<td><strong>6.0%</strong></td>
</tr>
<tr>
<td><strong>Acura</strong></td>
<td><strong>-3.2%</strong></td>
</tr>
<tr>
<td><strong>Audi</strong></td>
<td><strong>1.4%</strong></td>
</tr>
<tr>
<td><strong>Volvo</strong></td>
<td><strong>10.2%</strong></td>
</tr>
<tr>
<td><strong>Infiniti</strong></td>
<td><strong>0.0%</strong></td>
</tr>
<tr>
<td><strong>Mercedes-Benz</strong></td>
<td><strong>0.3%</strong></td>
</tr>
<tr>
<td><strong>Jaguar</strong></td>
<td><strong>-2.0%</strong></td>
</tr>
<tr>
<td><strong>BMW</strong></td>
<td><strong>-5.7%</strong></td>
</tr>
<tr>
<td><strong>Cadillac</strong></td>
<td><strong>-5.7%</strong></td>
</tr>
<tr>
<td><strong>Buick</strong></td>
<td><strong>-3.7%</strong></td>
</tr>
<tr>
<td><strong>Lincoln</strong></td>
<td><strong>7.4%</strong></td>
</tr>
</tbody>
</table>

Source: Cox Automotive - KBB Auction Values
Loan Terms Length
Keeping monthly payments low leading to longer terms – and reducing future sales

Percentage of new loans by term

<table>
<thead>
<tr>
<th>Term</th>
<th>Q4 2015</th>
<th>Q4 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>49 - 60</td>
<td>20.8%</td>
<td>18.7%</td>
</tr>
<tr>
<td>61 - 72</td>
<td>42.0%</td>
<td>40.3%</td>
</tr>
<tr>
<td>73 - 84</td>
<td>29.0%</td>
<td>32.1%</td>
</tr>
</tbody>
</table>

Percentage of used loans by term

<table>
<thead>
<tr>
<th>Term</th>
<th>Q4 2015</th>
<th>Q4 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>49 - 60</td>
<td>23.6%</td>
<td>23.6%</td>
</tr>
<tr>
<td>61 - 72</td>
<td>41.1%</td>
<td>41.1%</td>
</tr>
<tr>
<td>73 - 84</td>
<td>16.4%</td>
<td>18.2%</td>
</tr>
</tbody>
</table>

Source: Experian Automotive
Monthly Payment
Longer loan terms, higher subsidies are stabilizing payments; Falling “Spread” unfavorable to leasing

Source: Dealertrack
Summary

• Trump victory a surprise and economic policies have shaken the markets – both good and bad – but uncertainty is not a positive contributor to economic growth.

• Economic outlook remains on sound footing: robust job growth, stable consumer spending, low inflation…however business cycle timing suggests a change is coming. What? Monetary and fiscal policy mistakes are possible.

• Auto credit conditions now changing: growth now slowing, interest rates and subprime delinquencies rising. Pull-back in availability occurring.

• Auto Bubble Forming/Popping? High leasing rates + long-terms overselling market; flood of off-lease vehicles lowering auction prices, impacting residuals, making auto loans less attractive. Will be a headwind for next few years.

• Does weakness in automotive sector lead to economy-wide slowdown? Seems unlikely as long as job growth + low interest rates continues