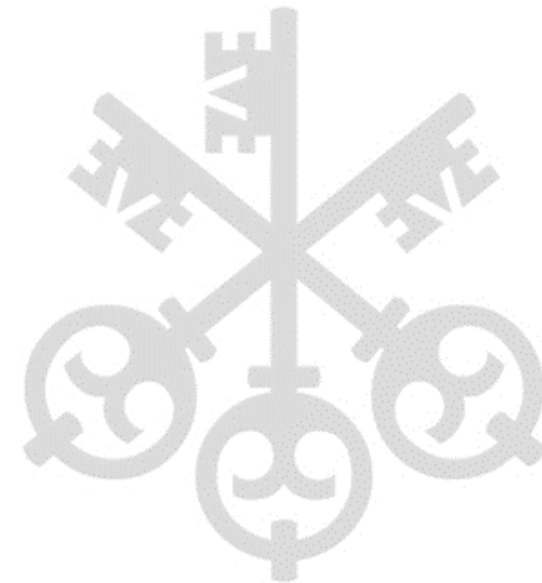


# US Autos Outlook Today & Beyond

Center for Automotive Research Management Briefing Seminar

Colin Langan  
*US Autos, Analyst*



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ANALYST CERTIFICATION AND REQUIRED DISCLOSURES BEGIN ON SLIDE 32

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## Agenda: *US Auto Outlook Today and Beyond*

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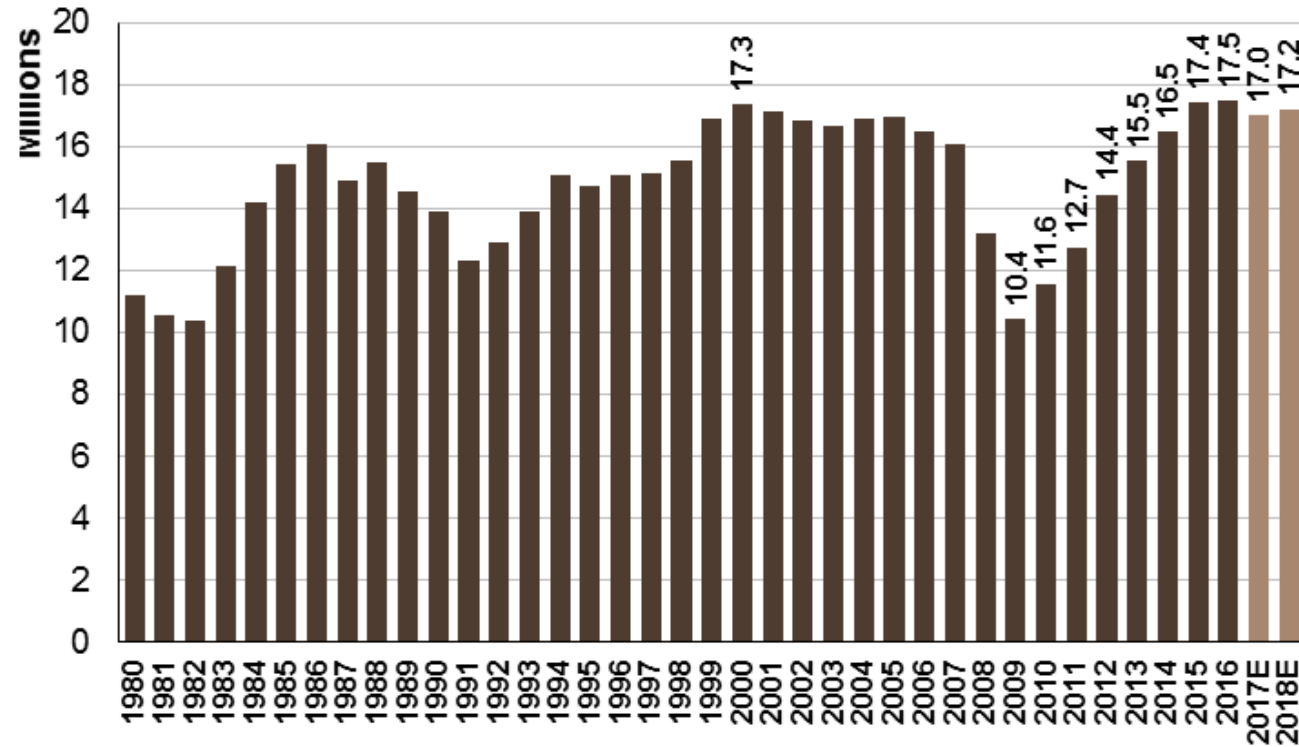
- Near Term Outlook
- Electric Car Teardown
- Autonomous Cars
- Big Data Revolution

Section 1

## Near Term Outlook: The Sky Isn't Falling Yet

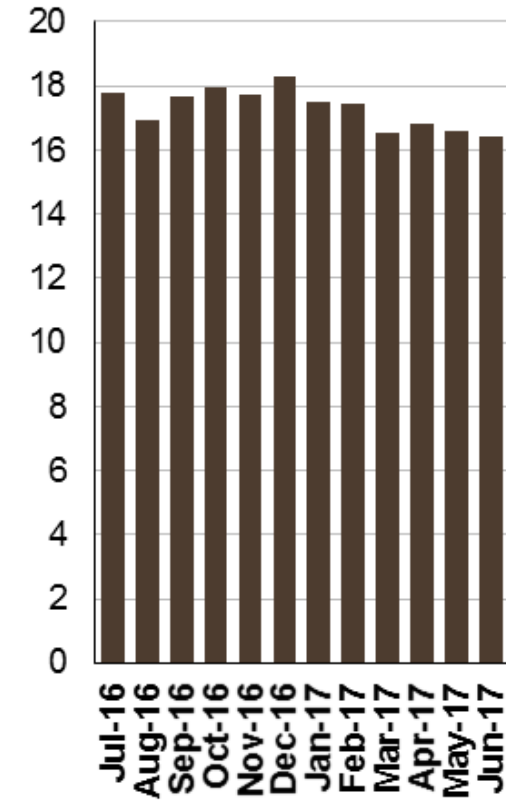
# US Sales Forecast

US Sales Forecast



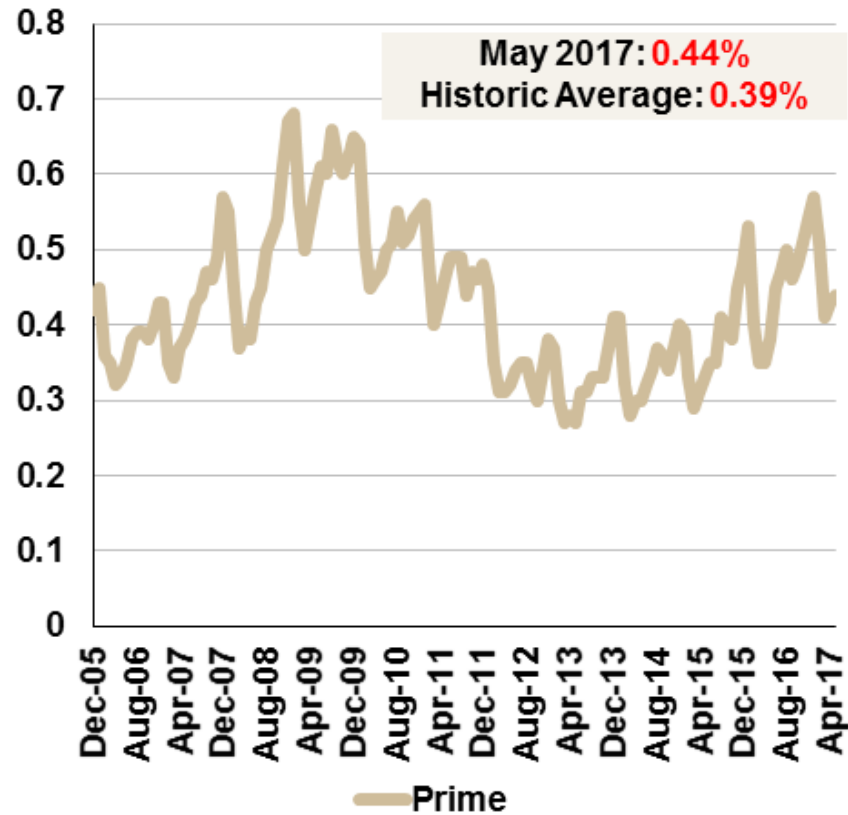
Source: Wards, UBS estimates

US SAAR Trend



# Concern #1: Deteriorating Credit

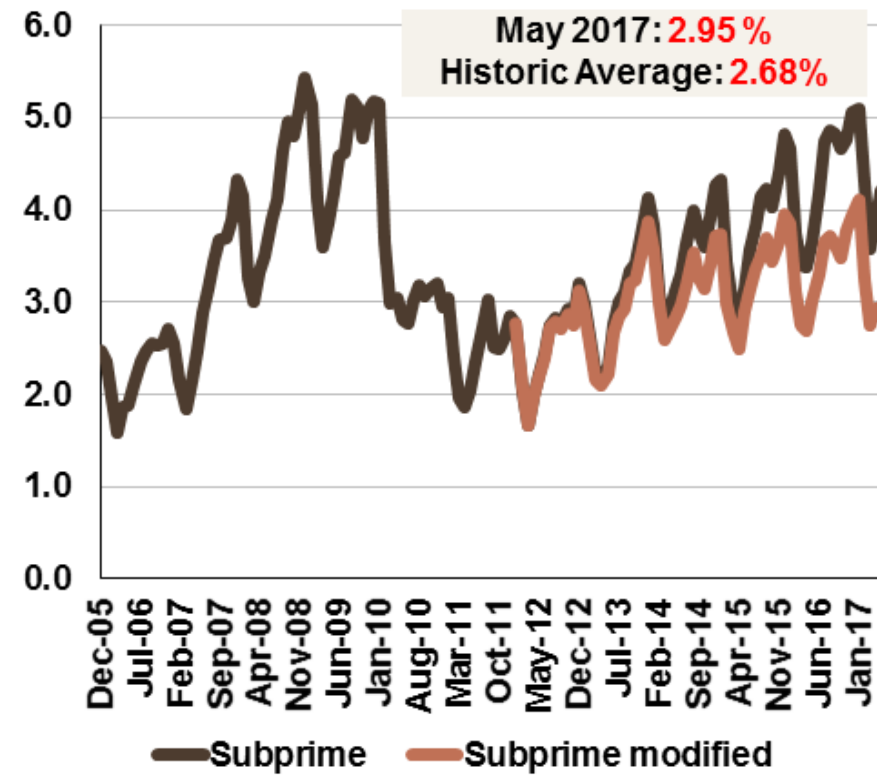
+60 Day Delinquencies Prime



Source: S&P, UBS



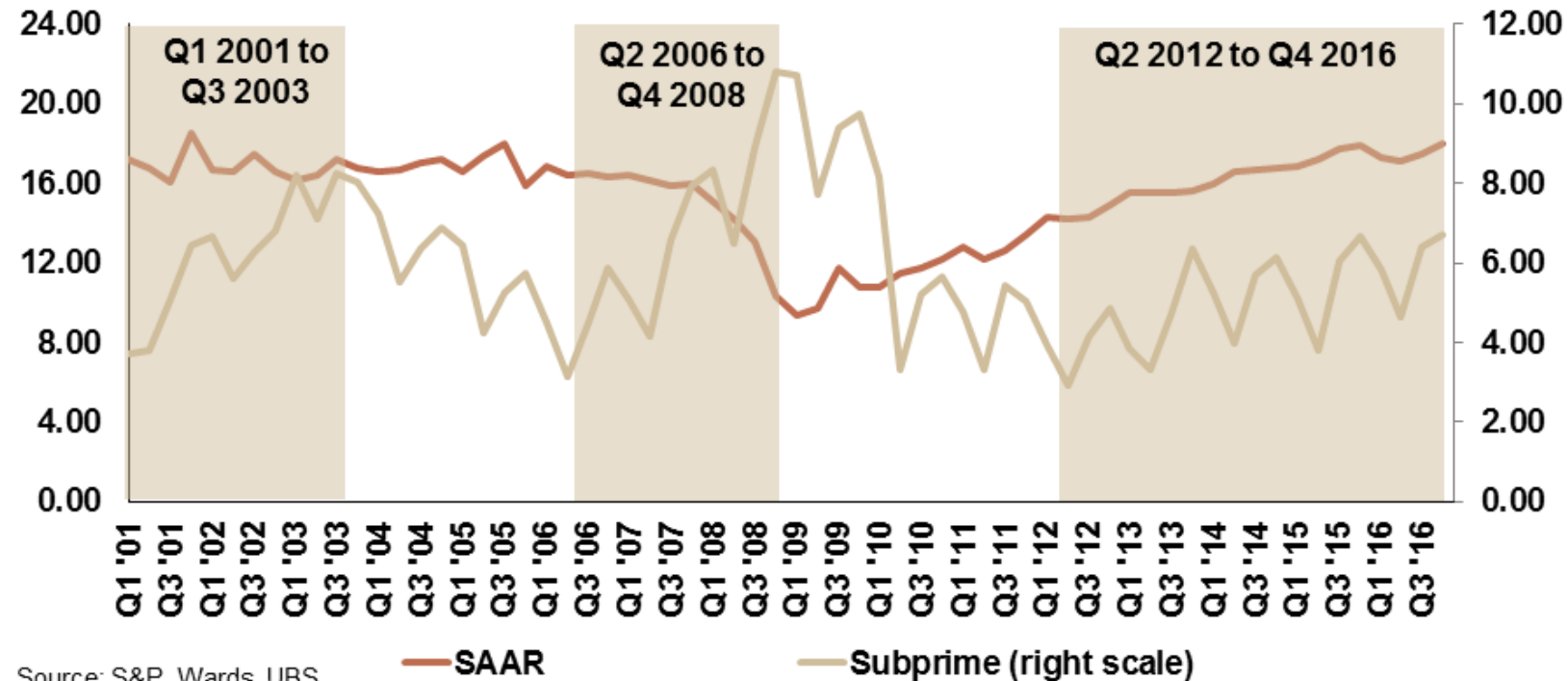
+60 Day Delinquencies Subprime



Source: S&P, UBS

# Credit Risk More Price Than Volume Historically

ABS Net Loss Rate vs. SAAR

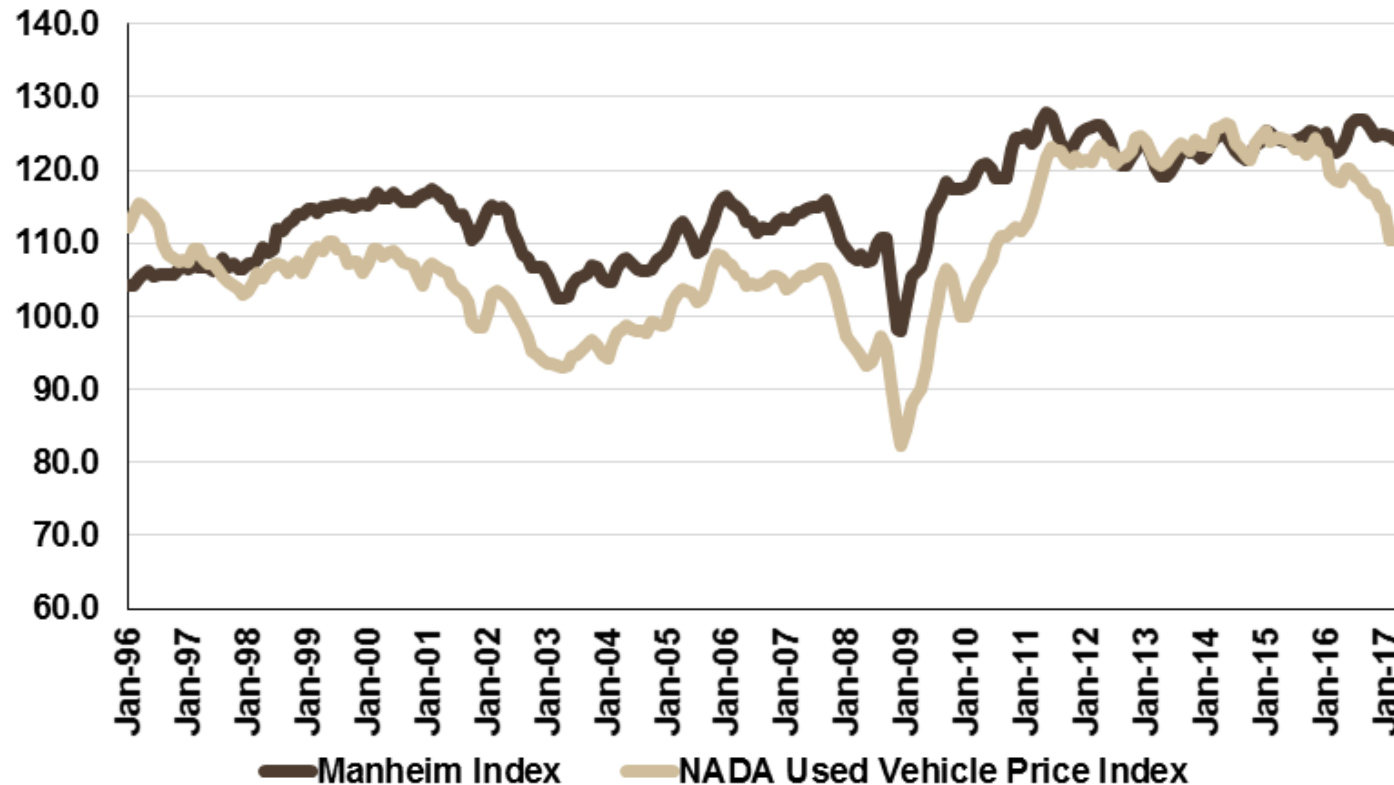


## Concern #2: Used Pricing Concerns

*Supply: Rising  
with higher off-  
lease vehicle  
returns*

*Demand:  
Lenders are  
pulling back on  
subprime lending*

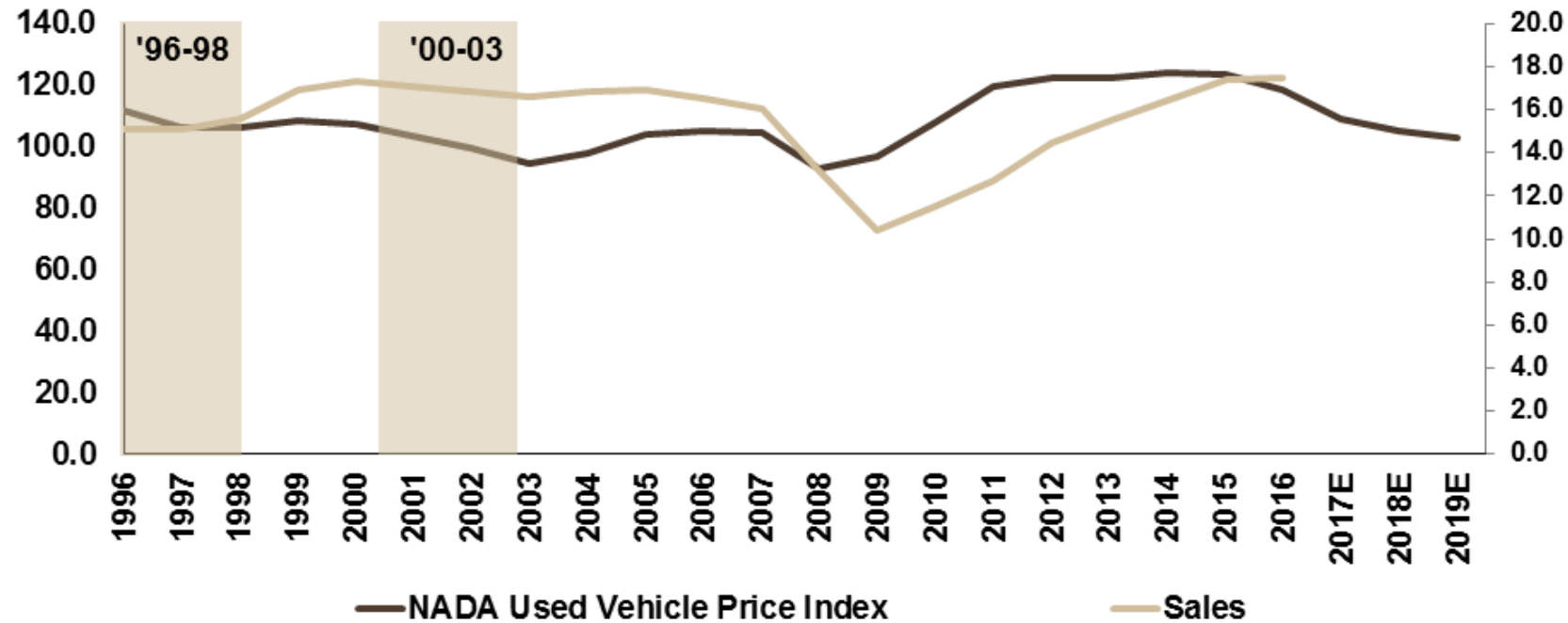
Historical used prices



Source: NADA, Manheim, UBS

## Used Prices Also Points to **Pricing Pressure vs. Volume**

NADA Used Index vs. SAAR



Source: NADA, Wards, UBS



## Macro Indicators Are Strong

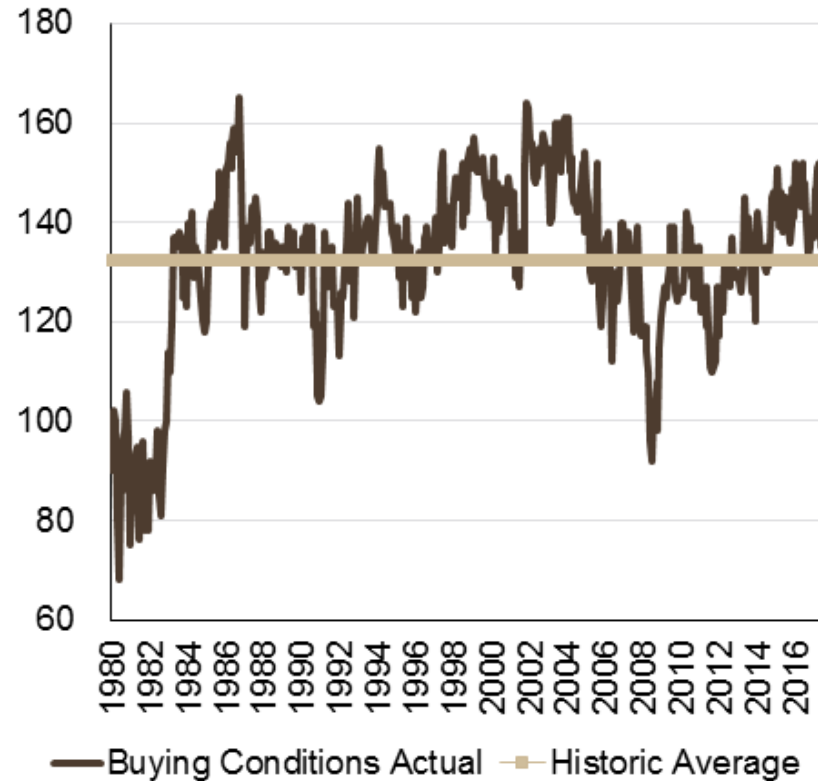
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	Last Update	Current	Prior Year	Y/Y
U of M Conditions for Buying New	Jun-17	141	144	↓
Used CPI	Jun-17	1.372	1.434	↓
Incentives (Autodata)	Jun-17	3,616	3,237	↑
Unemployment	Jun-17	4.4%	4.9%	↓
Housing Starts	Jun-17	1.215	1.190	↑

Source: Wards, U of M Consumer Survey, US Dept of Labor, US Census

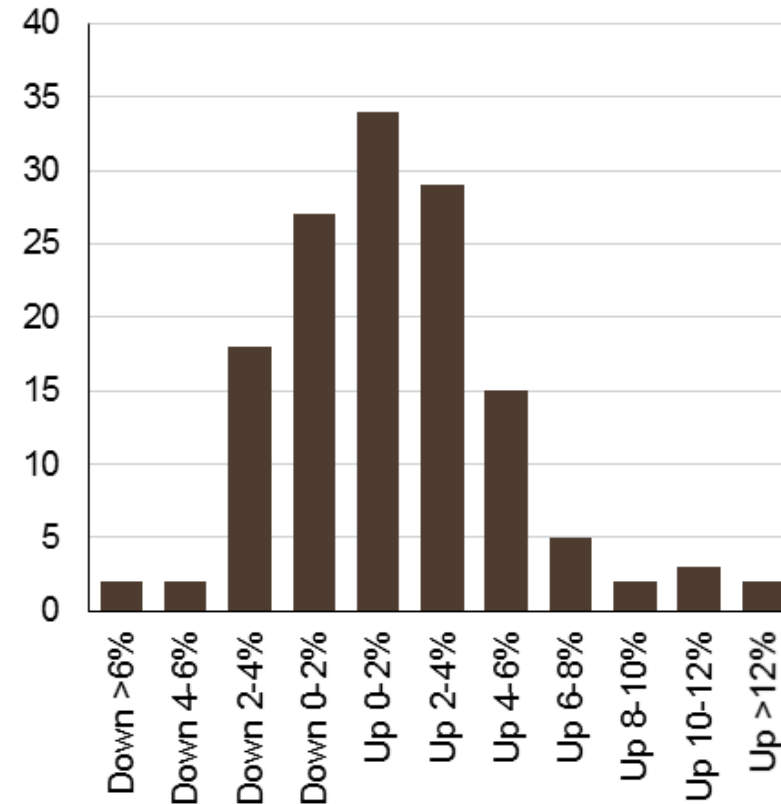
# Consumer Buying Conditions Remain Strong

U of M Conditions for Buying a New Vehicle



Source: U of M Consumer Survey

If U of M is in the 135-145 range, how did the average SAAR change over the following 6 months?



Source: U of M Consumer Survey, UBS

## GDP vs. SAAR Growth

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	# of Periods	Average SAAR Growth	Median SAAR Growth
<b>GDP &gt;5%</b>	8	8.0%	5.9%
<b>4-5%</b>	10	7.9%	8.5%
<b>3-4%</b>	10	1.5%	0.9%
<b>2-3%</b>	10	2.5%	2.4%
<b>1-2%</b>	6	1.5%	-0.9%
<b>0-1%</b>	2	-6.8%	-6.8%
<b>GDP &lt;0%</b>	7	-10.3%	-11.1%

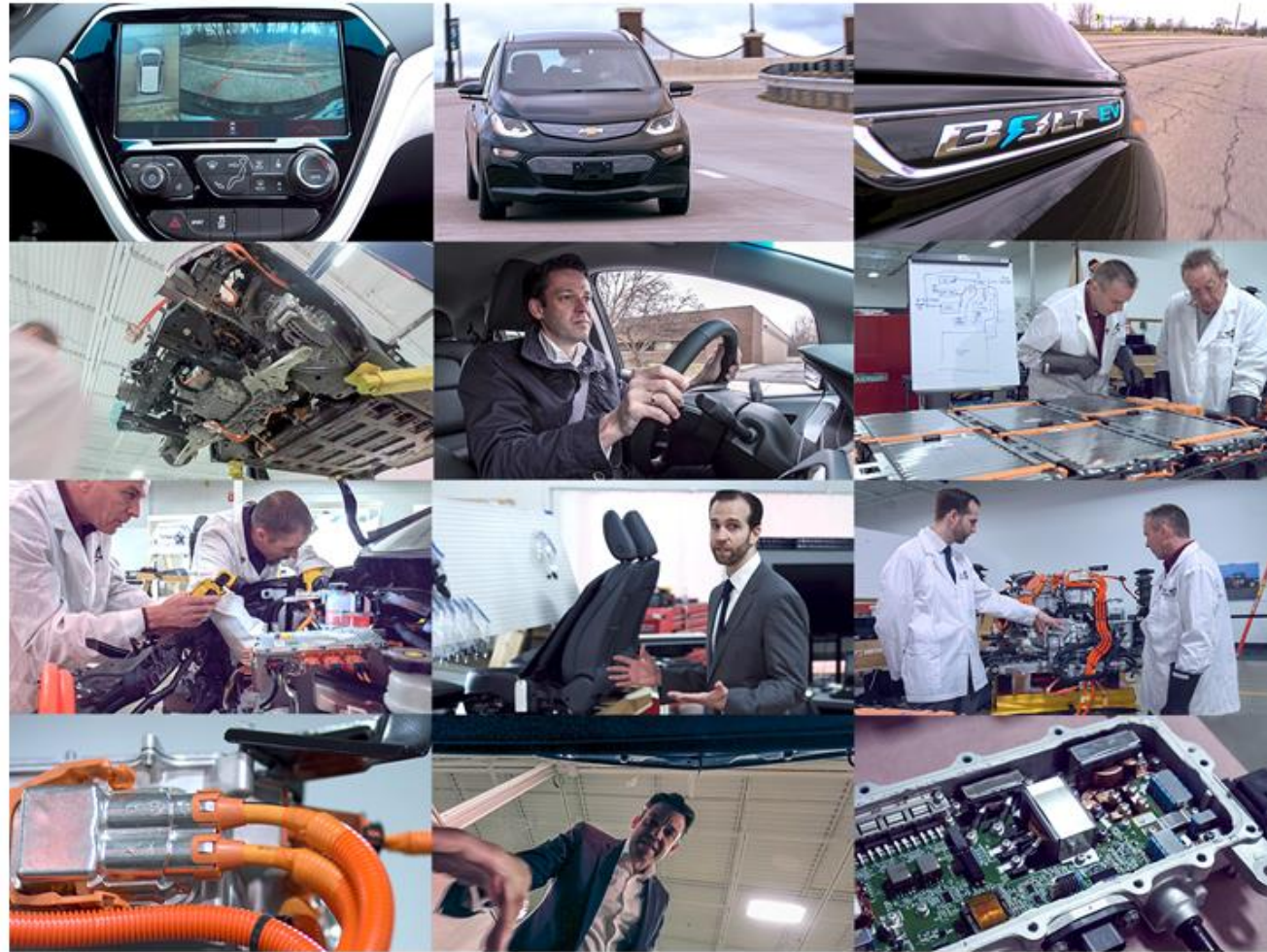
Source: Bureau of Economic Analysis, Wards, UBS

Section 2

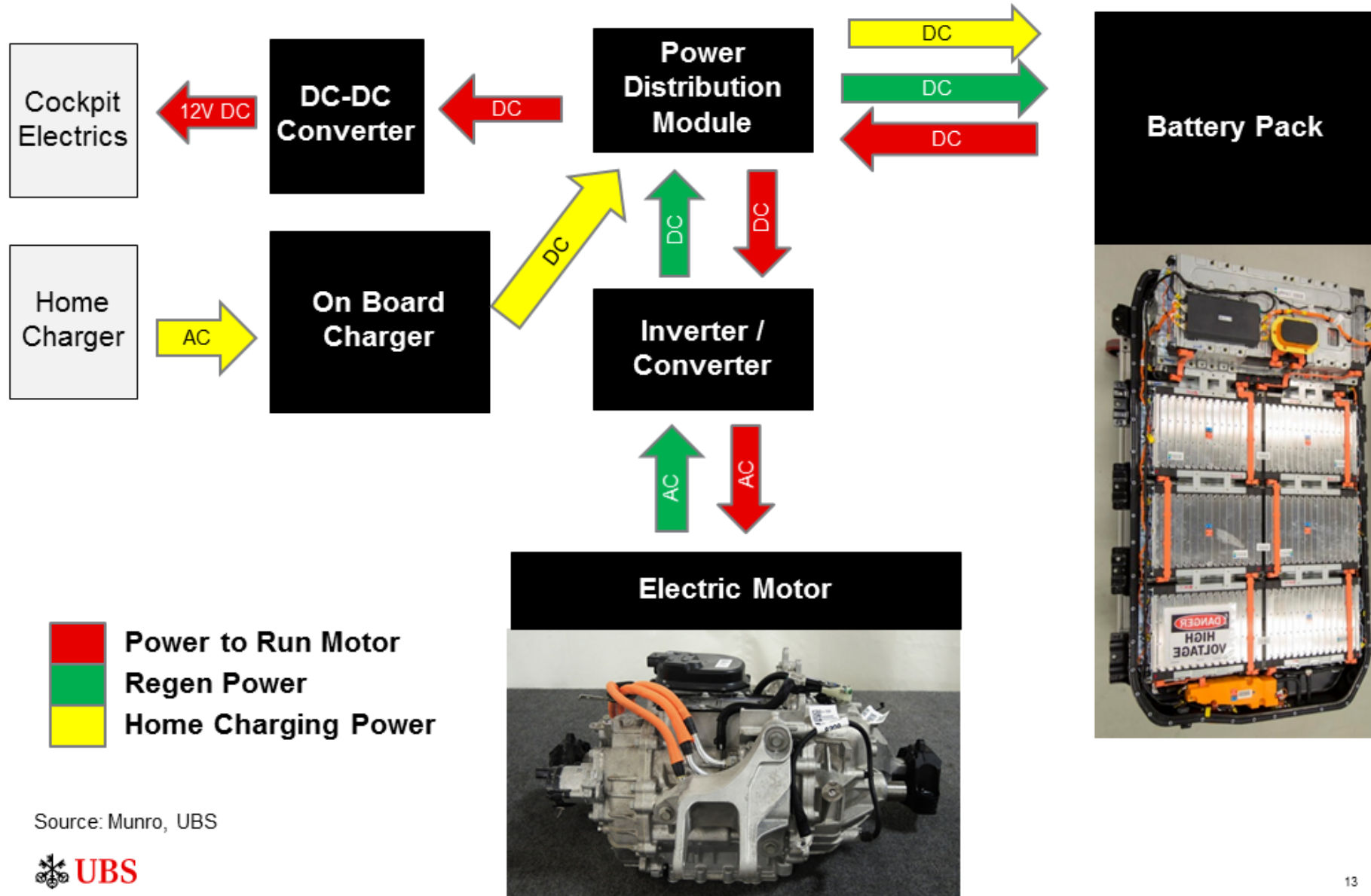
## What is the impact of Rising EV Demand?

# We tore down the world's first mass-market electric car

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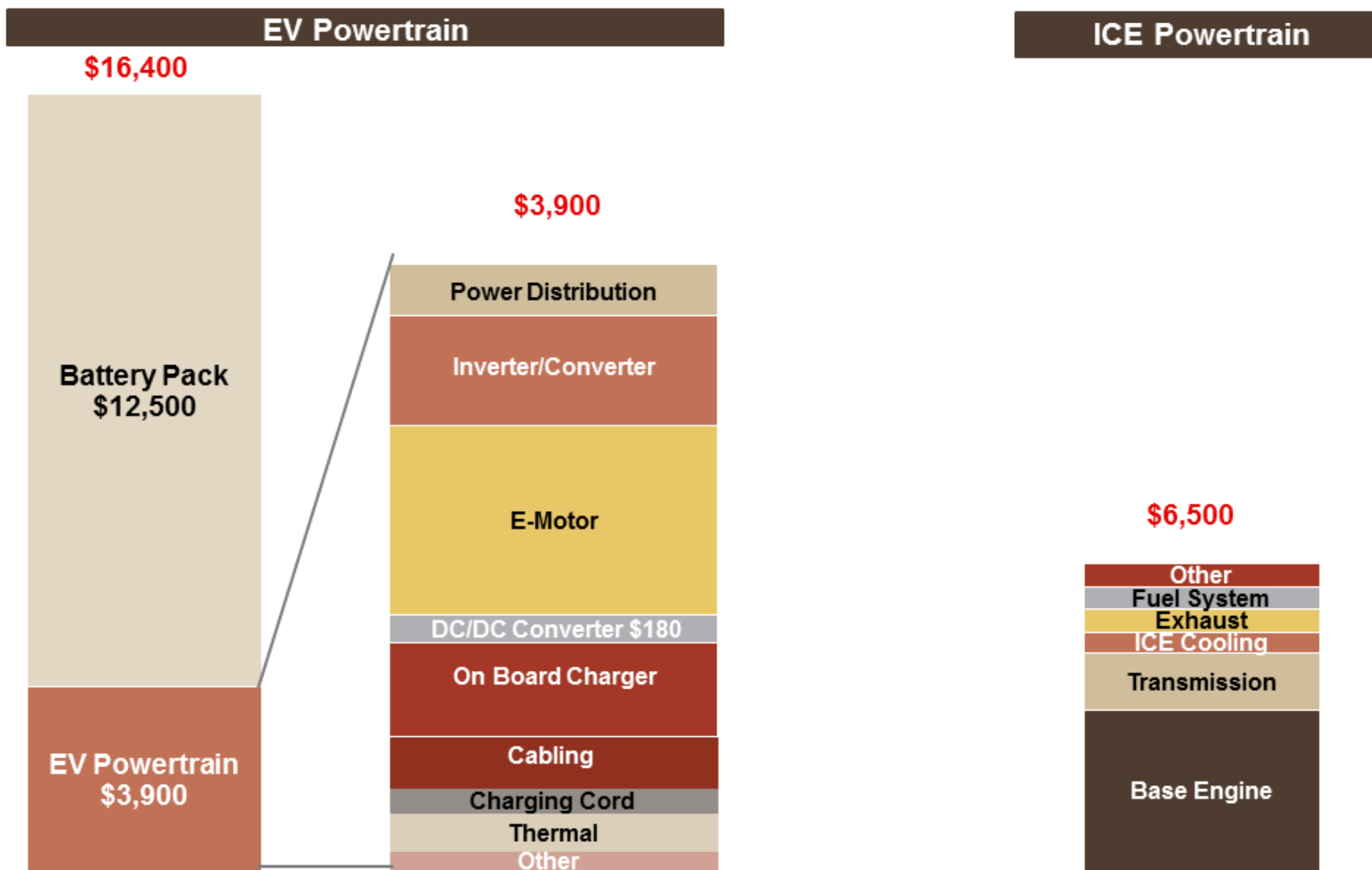


# What's in a EV?



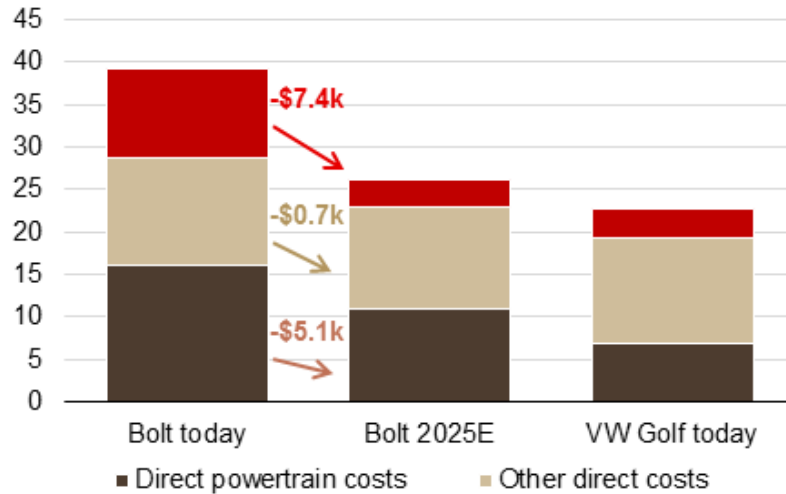


# Massive powertrain transition

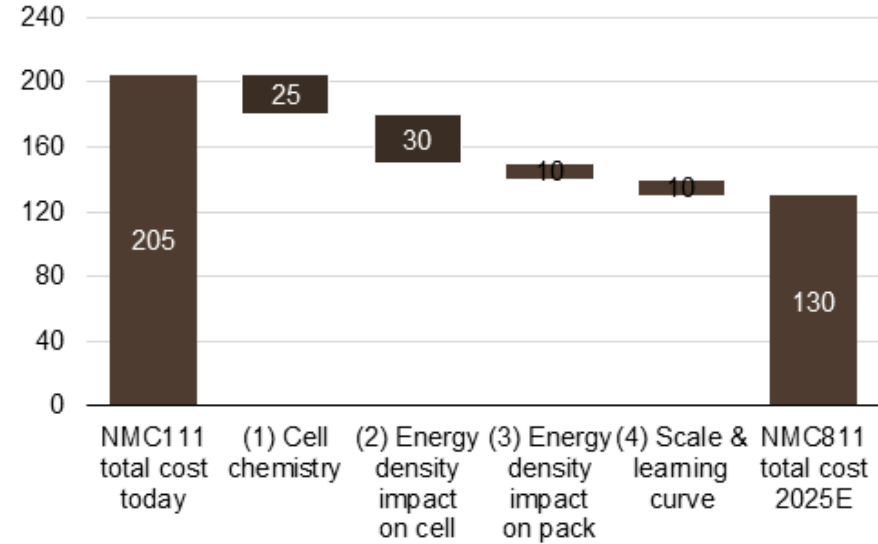


# We overestimated the Bolt's cost by ~\$5k

Cost breakdown (\$ per car) – Bolt versus Golf



Battery pack cost bridge 2017-2025E (\$/kWh)



The Bolt's powertrain is ~\$5k cheaper than we thought ...

... and the battery pack, the largest cost item, is likely to **decline faster**

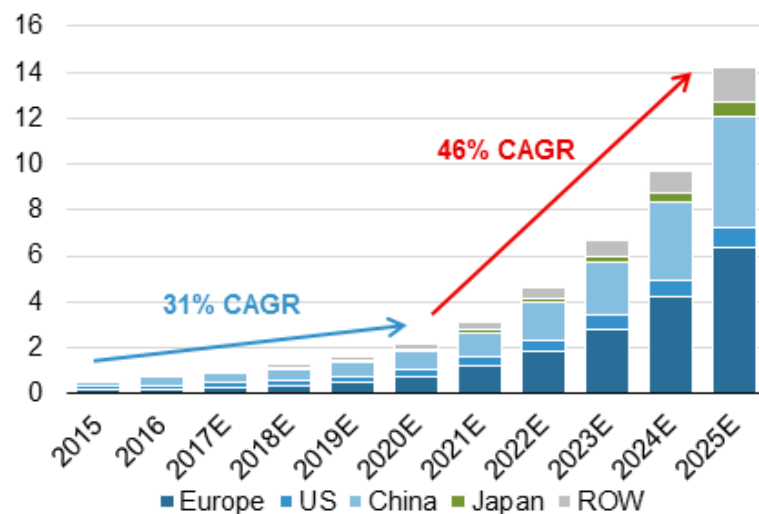
Therefore, the powertrain cost difference between the Bolt and a traditional engine will **shrink from ~\$10k today to \$3-4k by 2025**

Source: UBS estimates



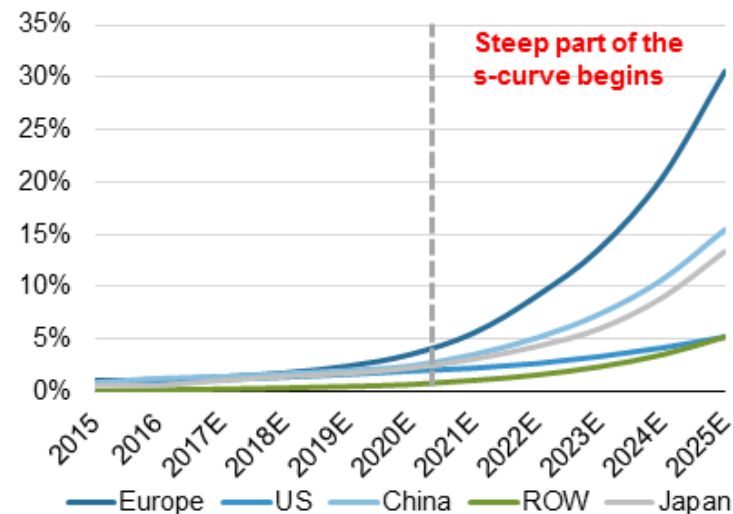
# We raise our EV penetration forecasts ~50% to **14% globally**

EV sales by region (m units)



EV sales penetration set to **meaningfully accelerate** after 2020

EV share by region (% of total car sales)



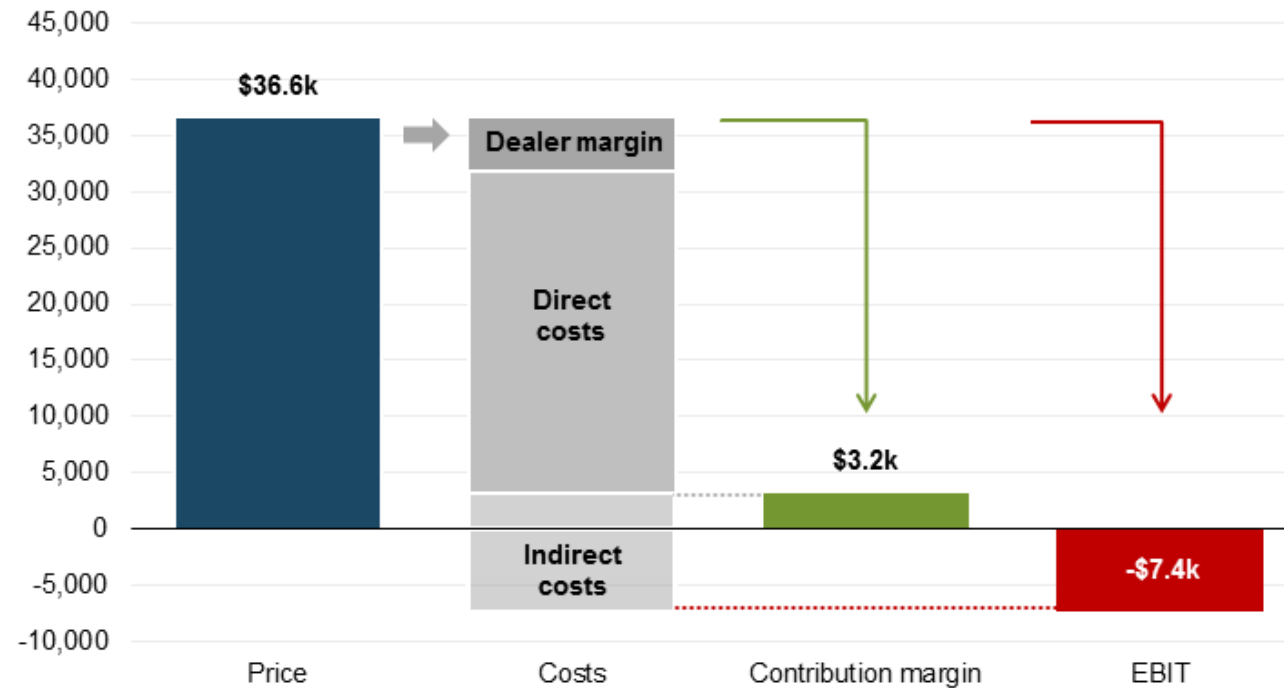
... particularly in **Europe**, where we now forecast **30% penetration** by 2025 (previously 18%)

**Sooner TCO parity** should spark **EV demand** and cause **faster penetration growth** than we previously assumed

Source: UBS estimates

# Evaluating the Chevy Bolt's profitability today

How much money does GM lose with a Bolt today (EBIT/contribution margin in \$)...

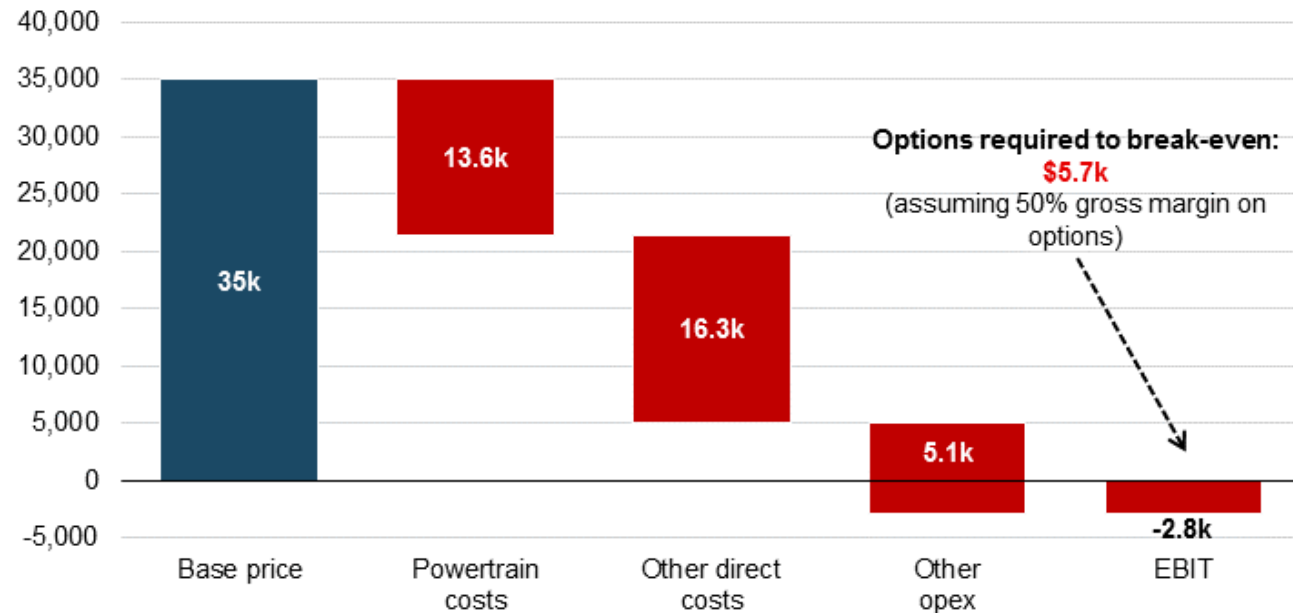


We estimate GM loses **~\$7k** per vehicle at **EBIT** level, but the **contribution margin** is in positive territory at **~\$3k**

Source: UBS estimates

# Evaluating the Tesla Model 3's profitability

What will be the break-even selling price (\$) for the Tesla Model 3?

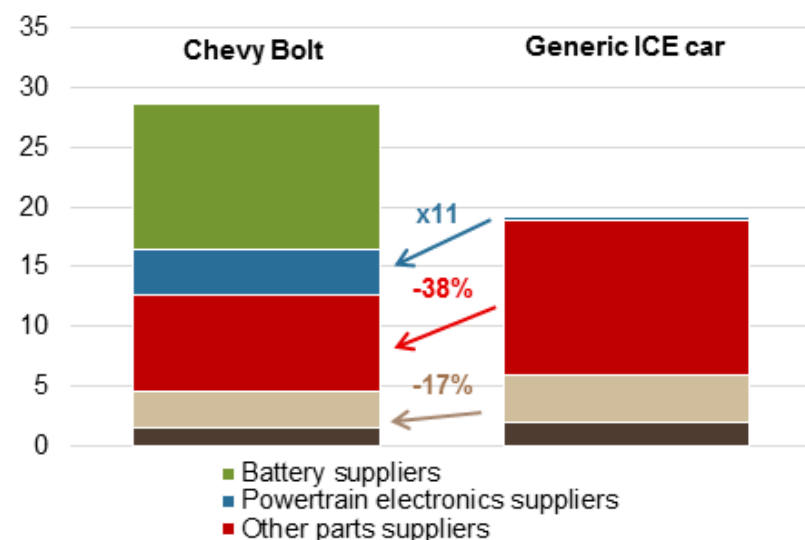


We estimate Tesla will require an achieved selling price of **~\$41k** for the upcoming Model 3 to **break even at the EBIT level**

Source: UBS estimates

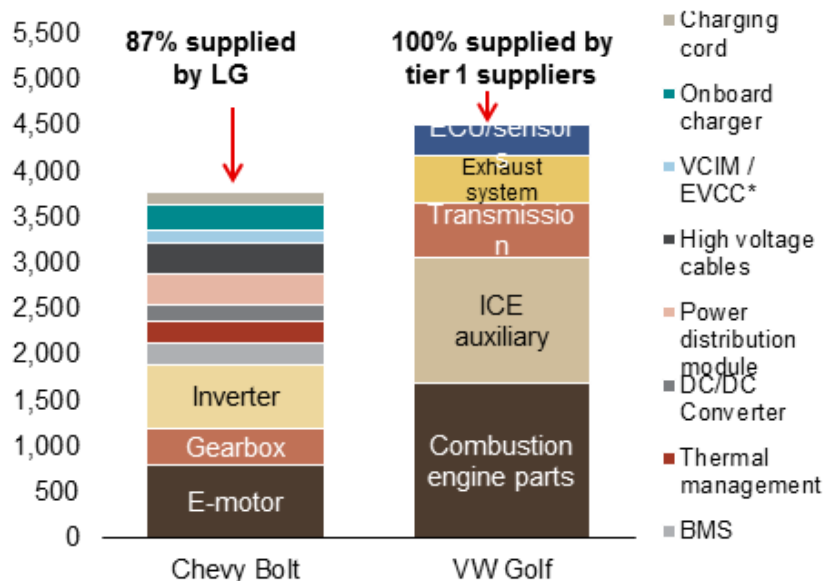
# The content share split changes meaningfully in the Bolt

Vehicle content on tier-1 level by sub-sector (\$k)



The **content share** of non-electronic suppliers in the Bolt falls by almost **40%**

Powertrain components – Bolt vs. Golf (\$)



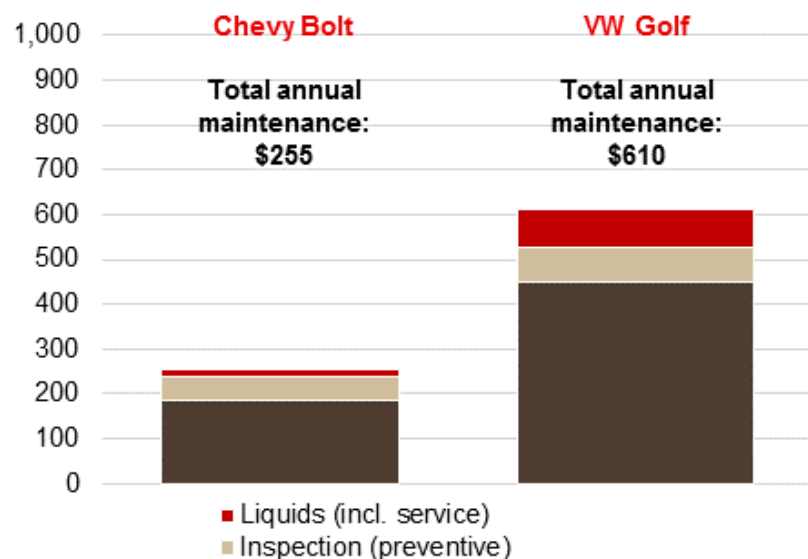
Powertrain electronics content is **\$4k higher** on tier-1 level, motor included

Some **56%** of the vehicle content comes from outside the traditional auto supply chain

Source: UBS estimates

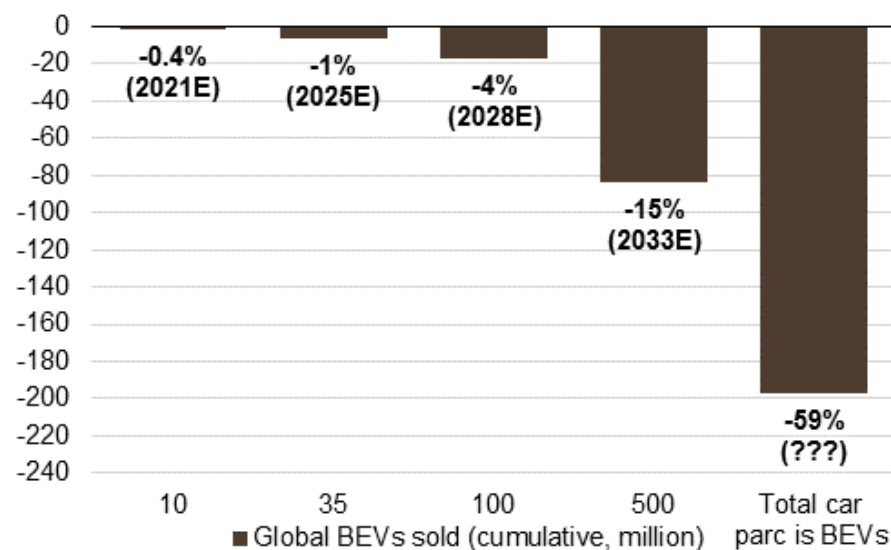
# The global **aftermarket** should shrink ~60% long-term

The Bolt has ~60% lower after-sales costs (\$)



The annual maintenance costs for the Bolt are about **\$355 lower** than for the Golf

Global aftermarket revenue (\$bn) to drop by ~60%

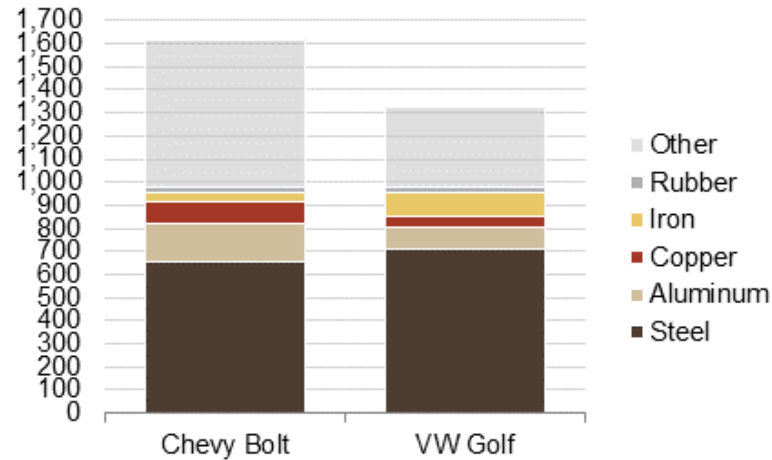


The global automotive aftermarket should ultimately shrink by **c60%**, though a material impact should **not be felt before ~2030E**

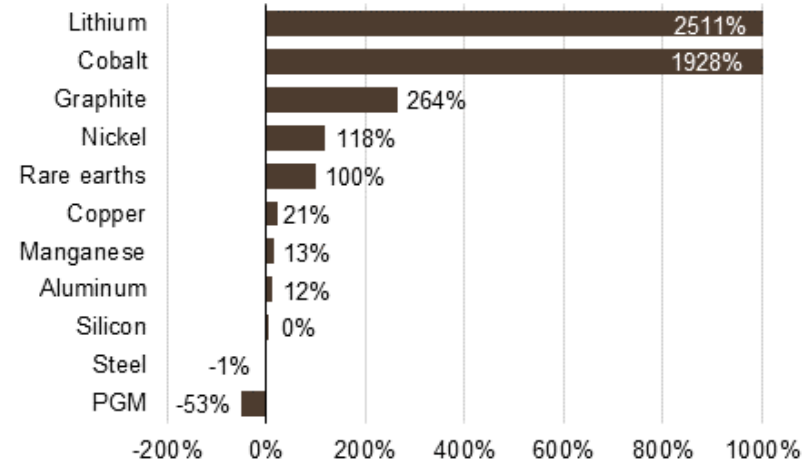
Source: UBS estimates

# Some **commodities** will be heavily impacted by EVs

Weight of key commodities (kg) – Bolt vs. Golf



Incremental commodity demand in a 100% EV world  
(% of today's global production)



In the Bolt (compared to the Golf), we found ...

~70% more **aluminium**,

~80% more **copper**

~7% less **steel**,

~60% less **iron**

100% less precious **metals**

~140 kg of "active" materials in the battery cells

~1 kg of **rare earths** in the e-motor

Source: UBS estimates

Section 3

## What is the impact of the Autonomous Car?

## What is our base outlook?

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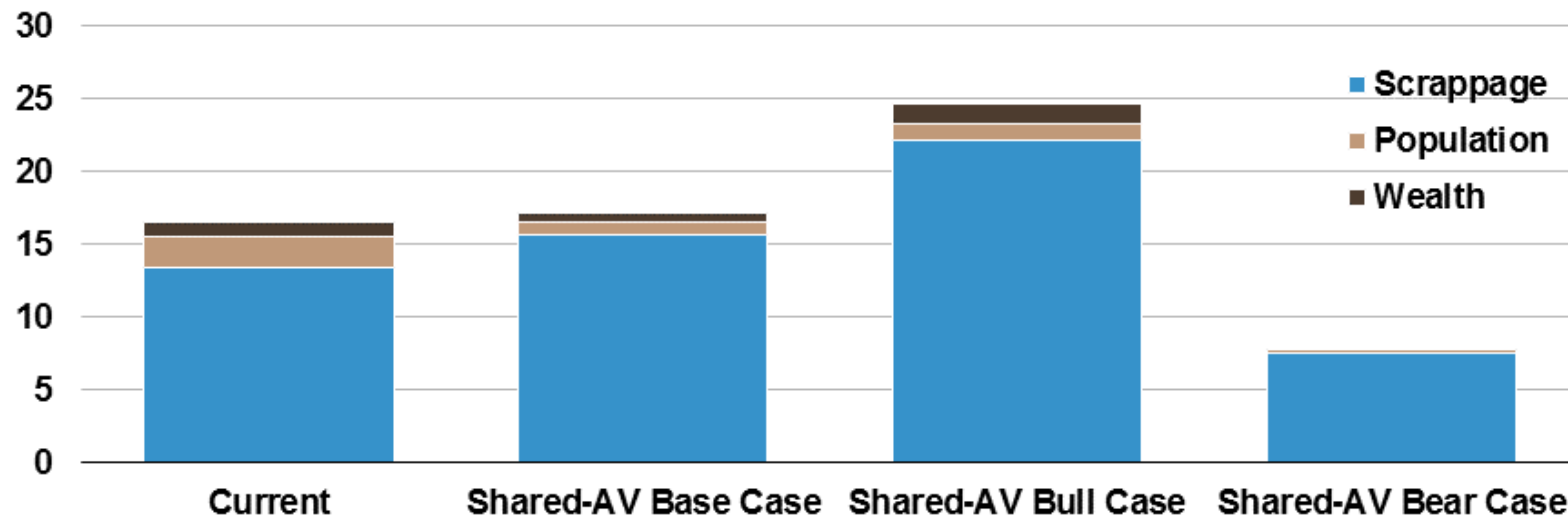
- See **Fully Autonomous** (Level 5) as **Decades Away**
  - *Experts at MIT, Stanford, startups like nuTonomy*
- **Level 4 Coming Soon**
  - *Geo-fenced, range bound **niche** applications*
- **Challenges**
  - *Almost perfect technology needed*
  - *Precedent in aerospace and space travel*
  - *Ethical, legal, & regulatory risks*



## Autonomous Driving **New Sales Impact**

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- Concerning Headlines
  - MIT Singapore Study: 60% decline in fleet
- Despite a decline in the size of the fleet, normalized US sales could actually increase new vehicle sales
  - Offsets: Vehicle life, Addressable market, & Demand growth



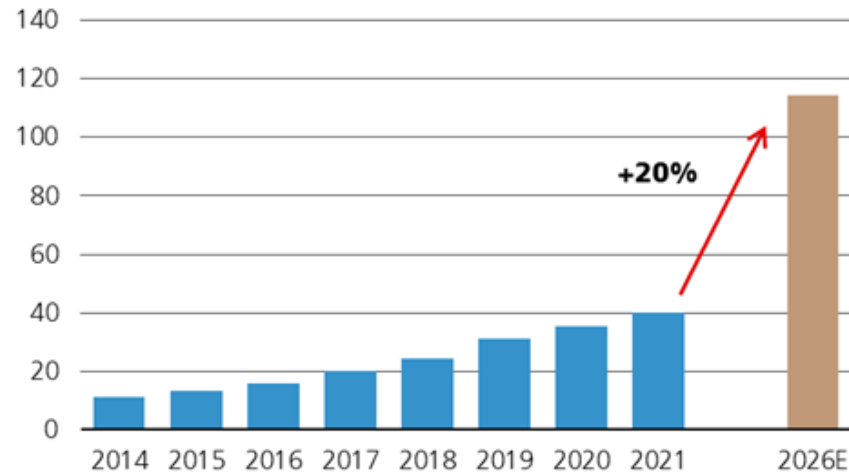
Source: UBS

Section 4

## How will Big Data transform the auto industry?

# Value of Big Data

Vehicles Sold with Embedded Modems (m)



Source: IHS (June 2015), UBS estimates (2026E)

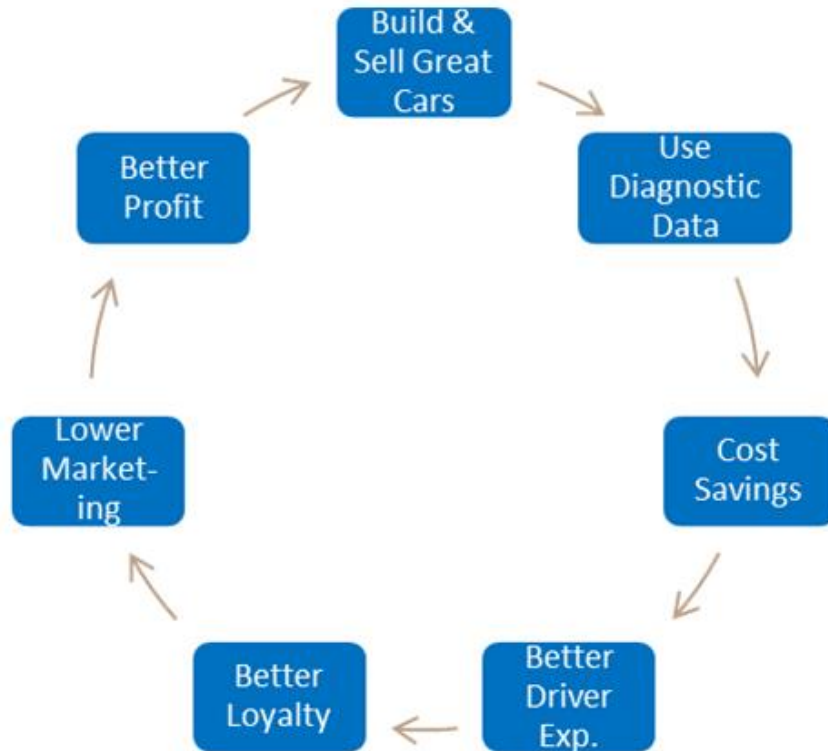
## What the future car knows about you?



Source: UBS

# Big Data: Superior Consumer Experience

## New Auto Business Model



Source: UBS

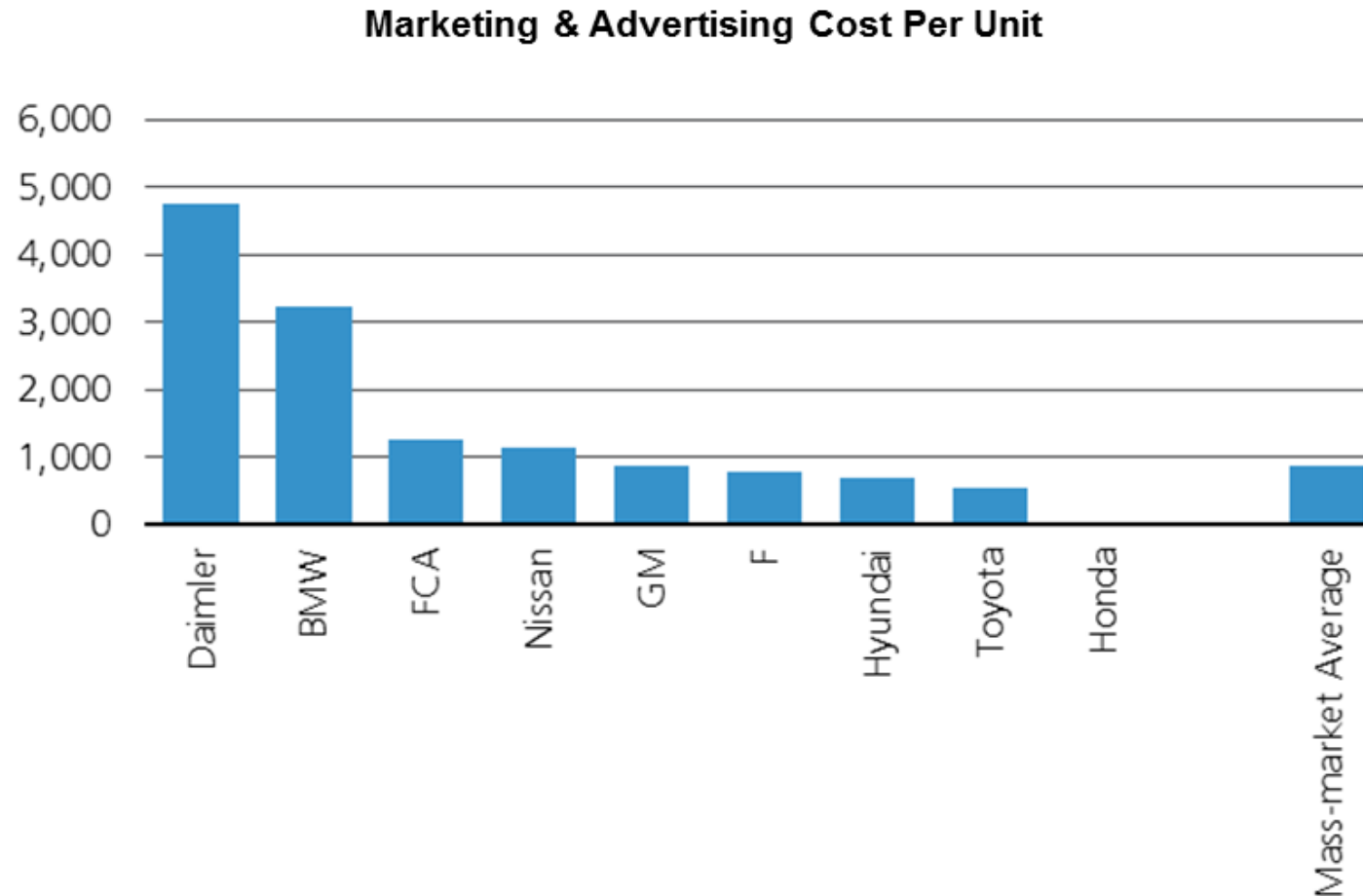
## New Dealer Servicing Model



Source: UBS

# Big Data: Sales & Marketing

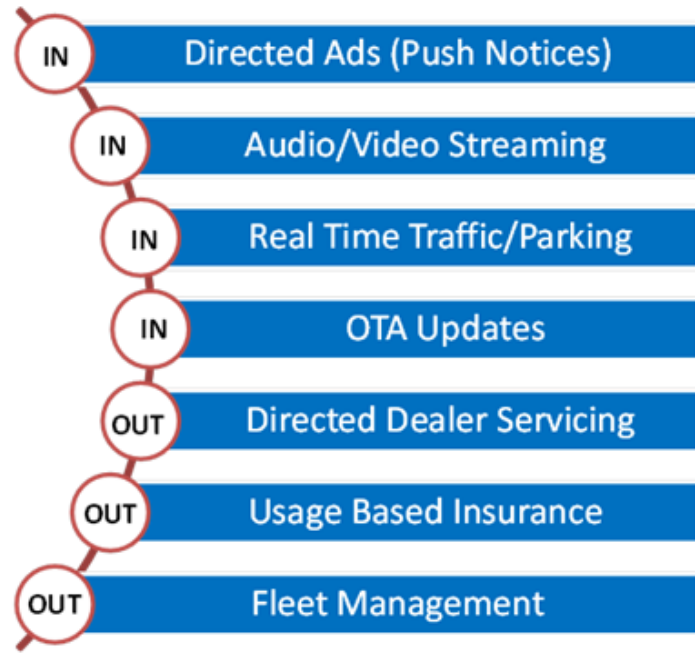
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Source: UBS

# Big Data: Non-Traditional Revenue Opportunities

## New Non-Traditional Revenue Opportunities



Source: UBS

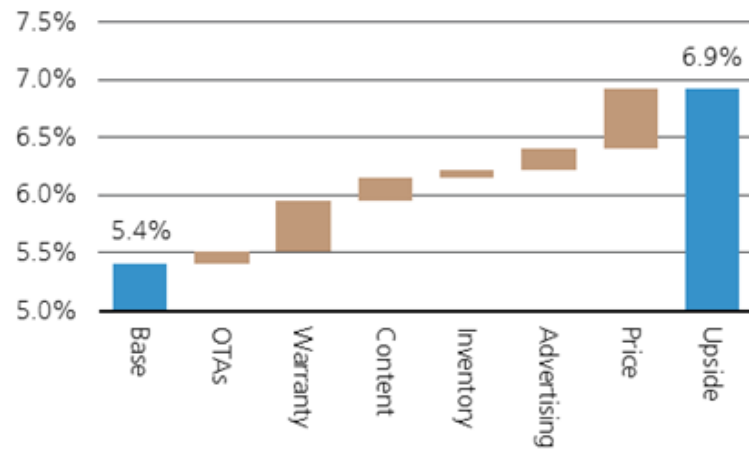
## New Global 2016E Revenue Opportunities

	Bear	Bull
Enhanced Dealer Servicing	13.6	34.0
Subscription-based Services	15.2	43.9
Paid Over-the-Air Updates	1.0	5.0
Used Based Insurance	0.2	1.1
Advertising	4.6	22.4
Streaming Audio	0.0	0.2
Streaming Video	0.3	2.9
Real-Time Data	0.0	1.0
Fleet Management	2.9	7.0
<b>Total (\$bn)</b>	<b>37.7</b>	<b>117.5</b>

Source: UBS

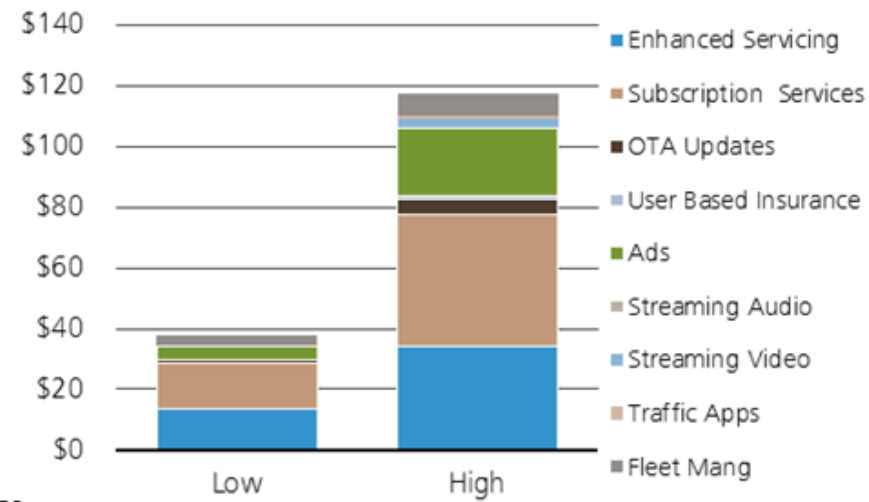
# Big Data: Economic Impact

## Global Auto Margin Opportunity



Source: UBS

## Potential Non-Traditional Revenue Opportunities



Source: UBS

# Thank You

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**If you have any questions, please reach out!**

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[colin.langan@ubs.com](mailto:colin.langan@ubs.com)



# Valuation Method and Risk Statement

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Our price targets are based on an EBITDA multiple, relative to the local market.

The global auto industry is highly cyclical, vulnerable to sudden shifts in consumer sentiment, employment, interest rates, available lending, and general economic activity. Parts suppliers are further exposed to customer pricing pressure, shifts in OEM market share, volatile production schedules, and unforeseen changes in technology.

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12-Month Rating	Definition	Coverage <sup>1</sup>	IB Services <sup>2</sup>
Buy	FSR is > 6% above the MRA.	45%	28%
Neutral	FSR is between -6% and 6% of the MRA.	38%	27%
Sell	FSR is > 6% below the MRA.	17%	11%
Short-Term Rating	Definition	Coverage <sup>3</sup>	IB Services <sup>4</sup>
Buy	Stock price expected to rise within three months from the time the rating was assigned because of a specific catalyst or event.	<1%	<1%
Sell	Stock price expected to fall within three months from the time the rating was assigned because of a specific catalyst or event.	<1%	<1%

Source: UBS. Rating allocations are as of 30 June 2017.

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