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Electric Vehicle Residual Value Outlook

Michael Vogan, Lead Auto Economist

Dec. 5th, 2017

Speaker

Michael Vogan

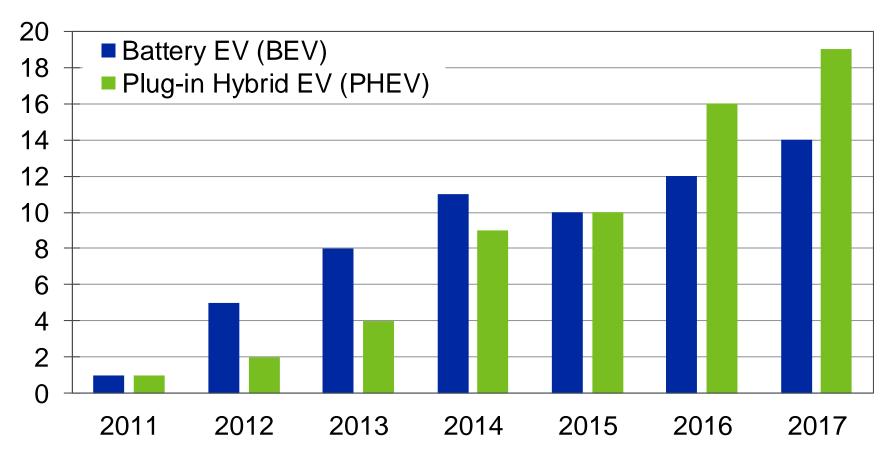


Michael Vogan is a Lead Auto Economist at Moody's Analytics. Before joining Moody's Analytics, Michael was a research analyst at the Federal Reserve Bank of Philadelphia.

He holds a master's degree in applied economics and econometrics from the University of Delaware and a bachelor's degree in economics from Bloomsburg University.

BEV and PHEV Variety Growing Rapidly

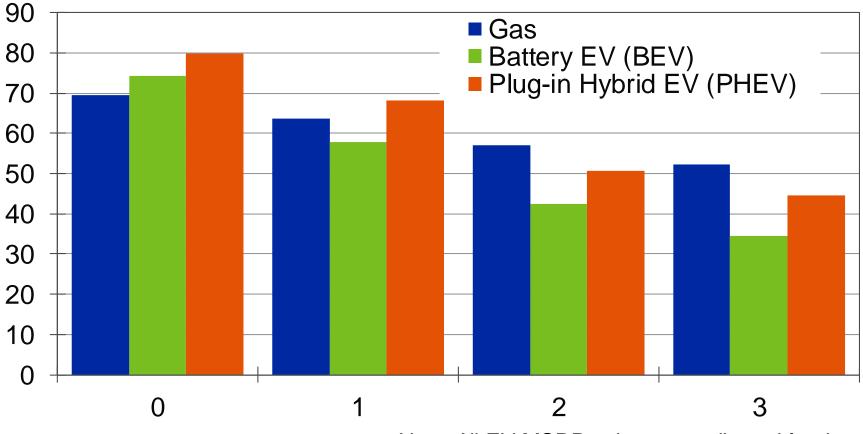
Number of unique models, by model yr



Source: Moody's Analytics

Wholesale Used BEV Prices Fall Fast

Avg. price-to-MSRP ratio by fuel type, by sale age in yrs



Sources: NADA, Moody's Analytics

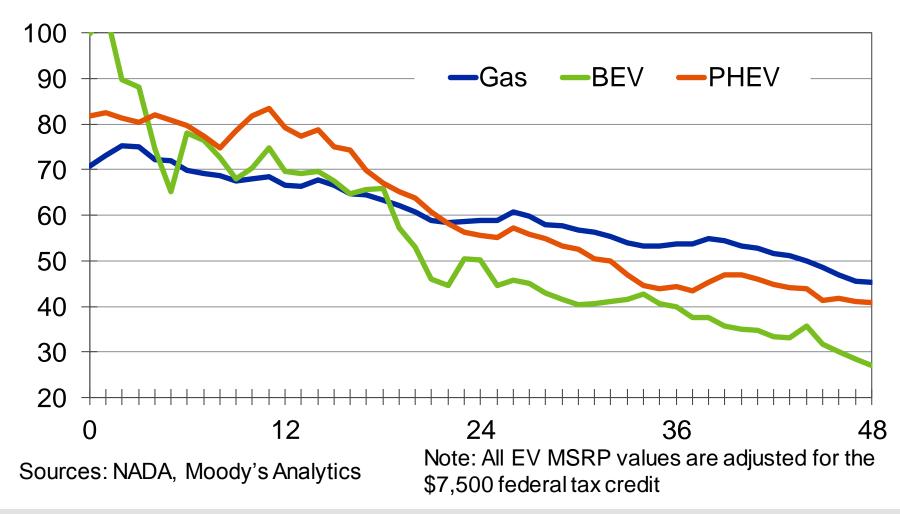
Used EV Demand Drivers

What could lower demand for used electric vehicles?

- » Automotive Industry Factors
 - Tax credits/rebates on new EVs
 - Changing consumer preferences
- » Technological Factors
 - Range anxiety on older models
 - Innovation-driven obsolescence
 - Battery degradation
- » Macroeconomic Factors
 - Low oil prices

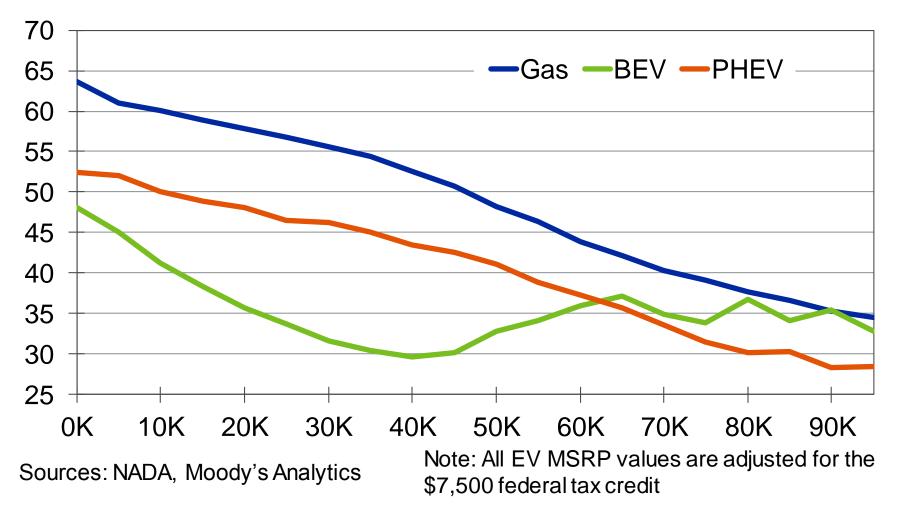
Depreciation Accelerates After One Year

Avg. price-to-MSRP ratio by fuel type, by sale age in months



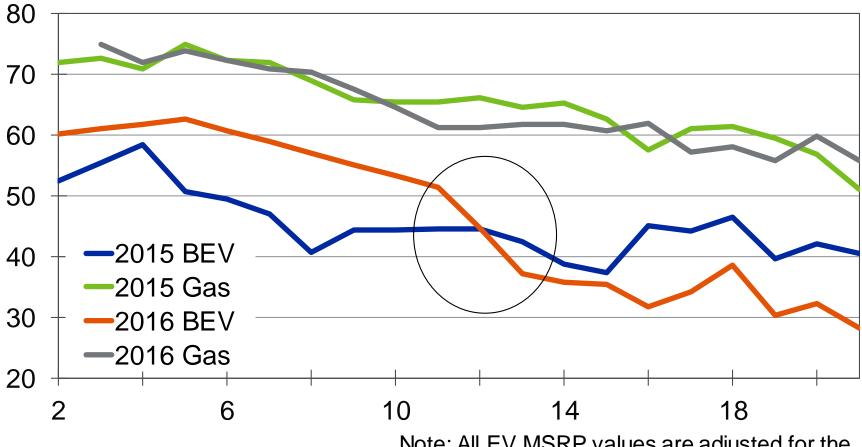
BEVs Sensitive to Initial Mileage Accrual

Avg. price-to-MSRP ratio, by mileage bucket, 3-yr-old vehicle sales



2017 Chevy Bolt Sunk 2016 Spark Prices

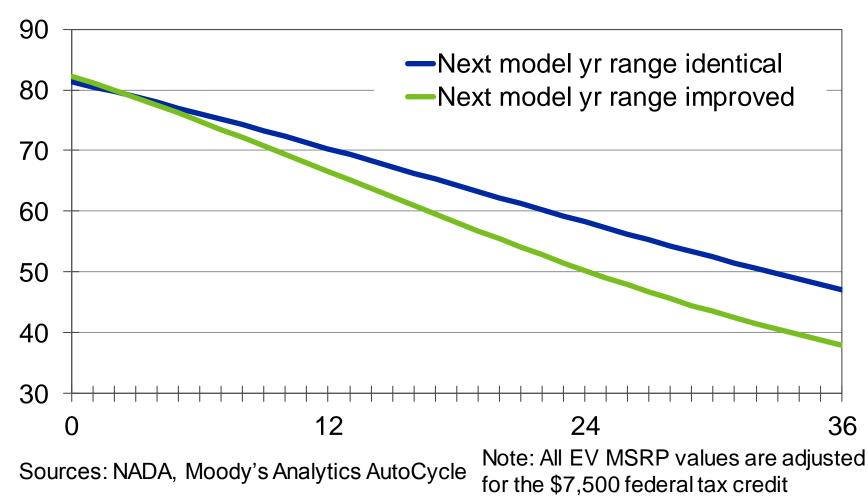
Avg. price-to-MSRP ratio, Chevrolet Spark, by monthly age



Sources: NADA, Moody's Analytics

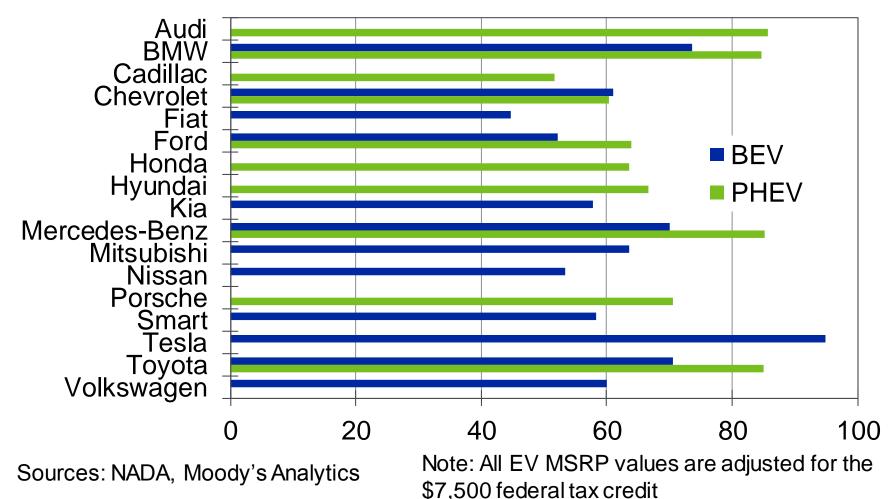
Range Improvements Cannibalize Prices

EV est. avg. price-to-MSRP ratio by, sale age in months



Luxury Brands Dominate EV Retention

Avg. price-to-MSRP ratio, by segment, by EV type, 1-yr-old sales, %



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Larger EVs Retain More Value

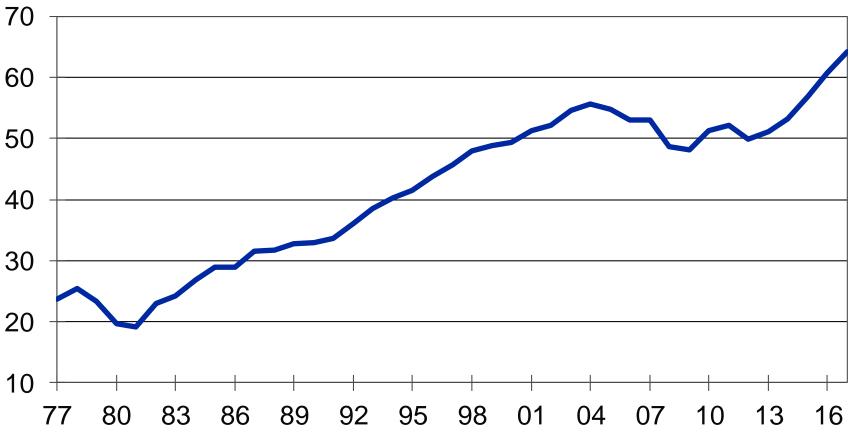
Avg. price-to-MSRP ratio, by segment, by EV type, 1-yr-old sales, %

Compact Utility Entry Subcompact Intermediate Compact BEV Intermediate Mid-Size PHEV Intermediate Subcompact Luxury Mid-Size Utility Luxury Sport Premium Luxury Large **Upper Compact** 100 20 40 60 80 Note: All EV MSRP values are adjusted for the Sources: NADA, Moody's Analytics \$7,500 federal tax credit

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EV SUVs Needed to Meet Demand

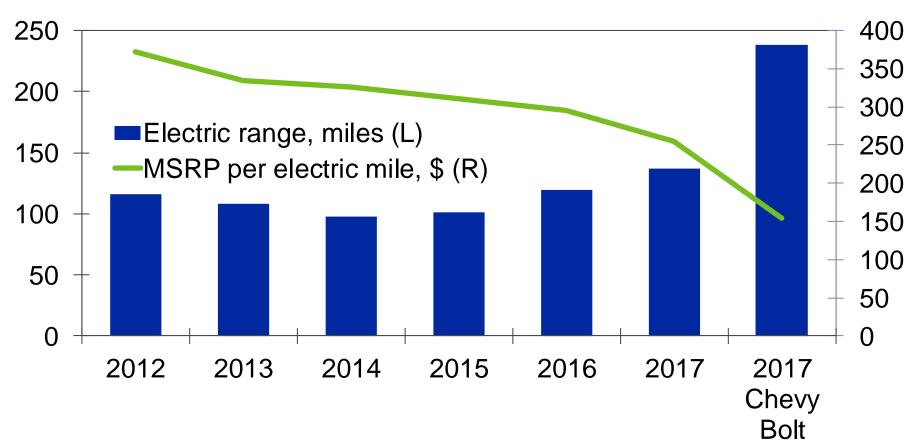
Share of U.S new truck/SUV sales, %



Sources: BLS, Moody's Analytics

BEV Range Improving at Lower Cost

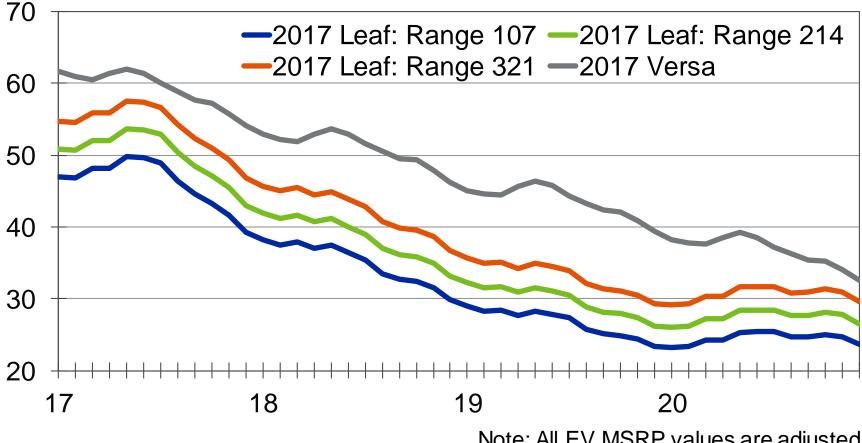
Model year avg. range and cost per electric mile



Sources: NADA, Moody's Analytics

Range Not Enough to Save Some BEVs

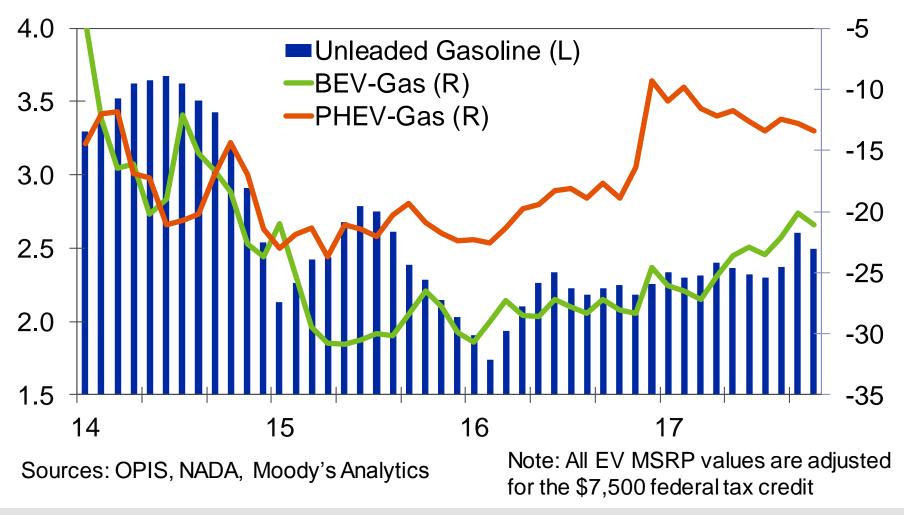
Est. avg. price-to-MSRP ratio, by range, by time



Sources: NADA, Moody's Analytics AutoCycle

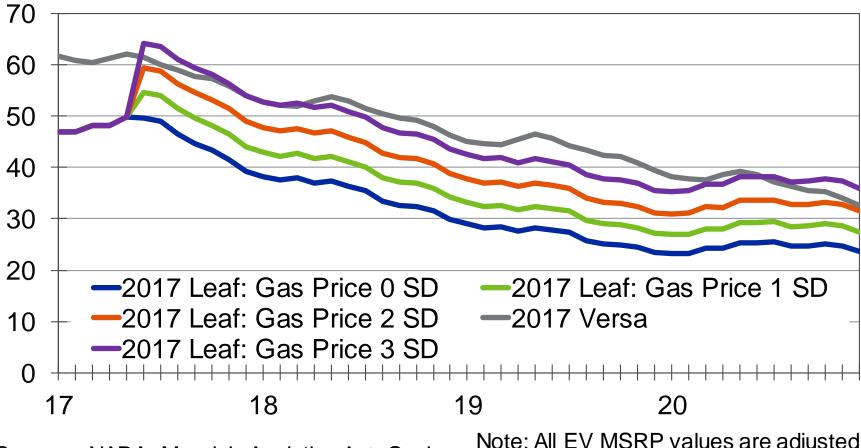
Low Gas Prices Weigh on BEV Prices

Gasoline Prices in \$ per gallon, Residual Value Difference in pp



High Gas Prices Are a Boon for BEVs

Est. avg. price-to-MSRP ratio, by gas price shock, by time



Sources: NADA, Moody's Analytics AutoCycle

Gas Price Pressures Will Continue

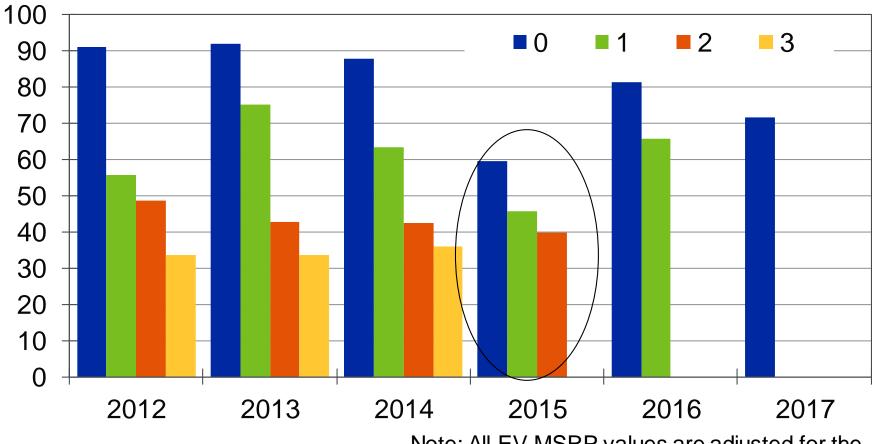
CPI: Urban Consumer - Gasoline (Index 1982-84=100, SA)



Sources: BLS, Moody's Analytics

2015 BEV Model Years Underperformed

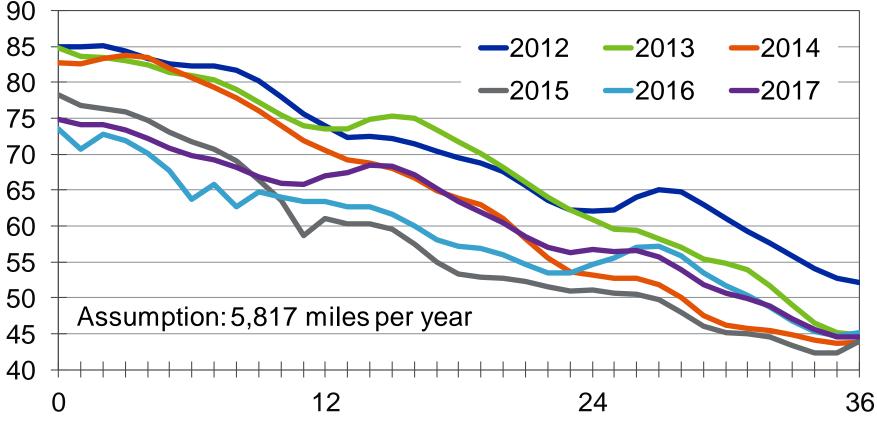
Avg. price-to-MSRP ratio by model yr, by sale age in yrs



Sources: NADA, Moody's Analytics

BEV Residual Values to Strengthen

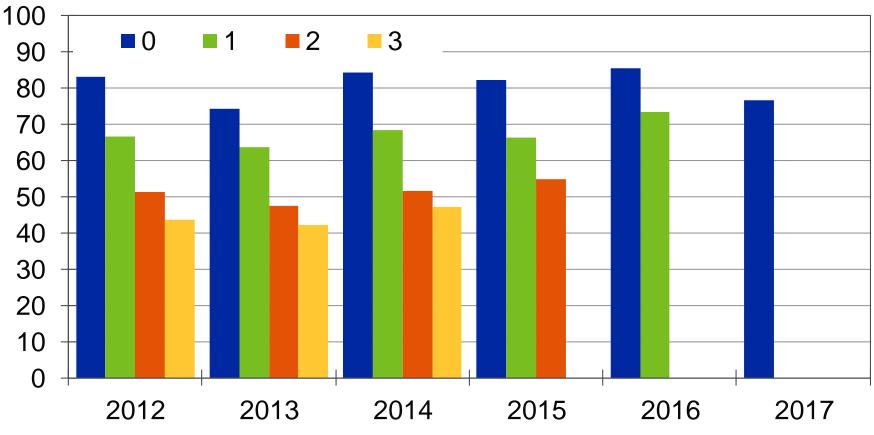
Est. avg. price-to-MSRP ratio, by model yr, by age in months



Sources: NADA, Moody's Analytics AutoCycle

PHEV Prices Improving With Time

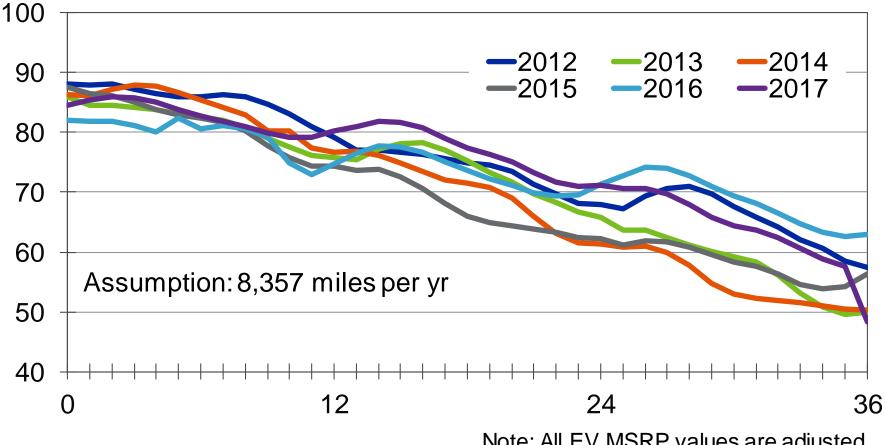
Avg. price-to-MSRP ratio by model yr, by sale age in yrs



Sources: NADA, Moody's Analytics

PHEV Residual Outlook Is Favorable

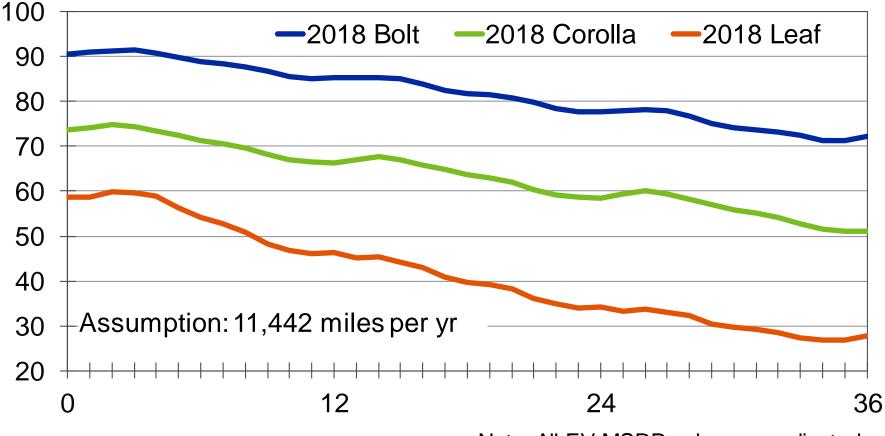
Est. avg. price-to-MSRP ratio, by model yr, by age in months



Sources: NADA, Moody's Analytics AutoCycle

Bolt to Stand Out Among Compacts...

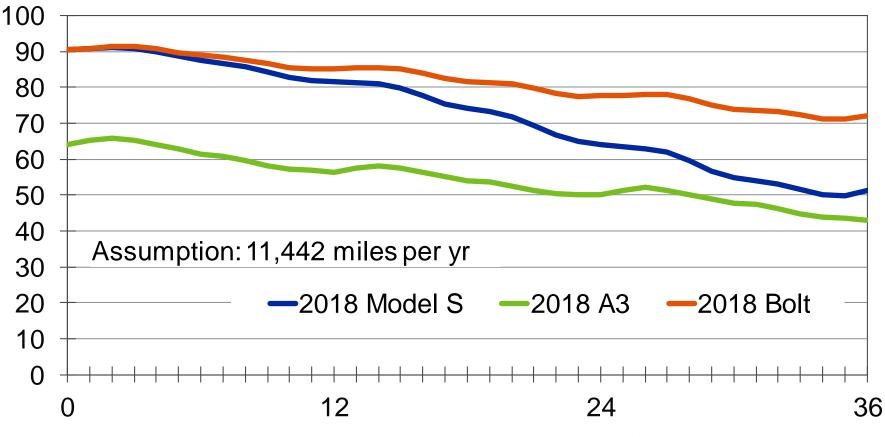
Est. price-to-MSRP ratio, by age in months



Sources: NADA, Moody's Analytics AutoCycle

... And Also to Outperform Model S

Est. price-to-MSRP ratio, by age in months



Sources: NADA, Moody's Analytics AutoCycle

Conclusion

EV residual values will be a mixed bag over the next few years

- » Low oil prices will continue to put downward pressure on EV sales and prices
- » PHEV vehicles will perform well while the BEV market matures
- Improvements in battery cost, quality, and range bode well for future model years, but early model years will obsolete quickly
 - However, basic subcompacts and sedans will still struggle with shifting consumer preferences
- » High quality, mass-market cars such as the Bolt and Model 3 should do well on the used market
- » Zero Emission Vehicle (ZEV) regulation will help develop EV markets overall, but removing the federal tax credit would slow things down

Q&A

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