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THE
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Forecasting in Times of Increased Volatility

Bloomberg Businessweek
November 13, 2018, 4:00 AM EST

A Strong U.S. Economy Will Boost Global Growth in 2019

APRIL 17, 2019

Summer 2019 gasoline prices forecast to be lower than last summer

OIL AND GAS

Producer cuts are set to boost the oil market in 2019, data firm projects

PUBLISHED SUN, DEC 23 2018 • 10:31 PM EST | UPDATED MON, DEC 24 2018 • 10:14 AM EST

Georgia economy still riding expansion wave into 2019
UGA forecast predicts job growth in all of Georgia's metro areas and rising home construction



What Makes a Good Forecast?

Accuracy

Timing

Assessment of Risk



Accuracy in Forecasts

Actual receipts vs. forecasted receipts

Overestimates vs. underestimates

Direction and size of bias



Timing of Receipts

Forecast on a quarterly basis, convert to monthly estimates

Adjust for seasonal differences

Payment of tax liabilities vs. receipts

Account for administrative charges



Assessment of Risk

Confidence in forecasted values

Sensitivity analysis –

- how sensitive to shocks

- what are the potential shocks

Matching revenues to expenditures based on risk assessment



Why volatility is a problem?

Most economic forecasts are based on historical patterns and recent trends

Difficult to match volatility of receipts with volatility of expenditures



Sources of Revenue Volatility

Changes in economic conditions

Legislative changes to the tax base

Changes in state or federal regulations

Changes in processing systems or data collection systems

Changes in consumption patterns

Changes in technology



Strategies for Dealing with Increased Volatility

Forecast major revenue sources separately

Specifically model revenue sources

Pay attention to timing of receipts

Update forecasts often

Analyze past forecasting errors

Talk with local business leaders and major employers – are the forecast drivers changing?



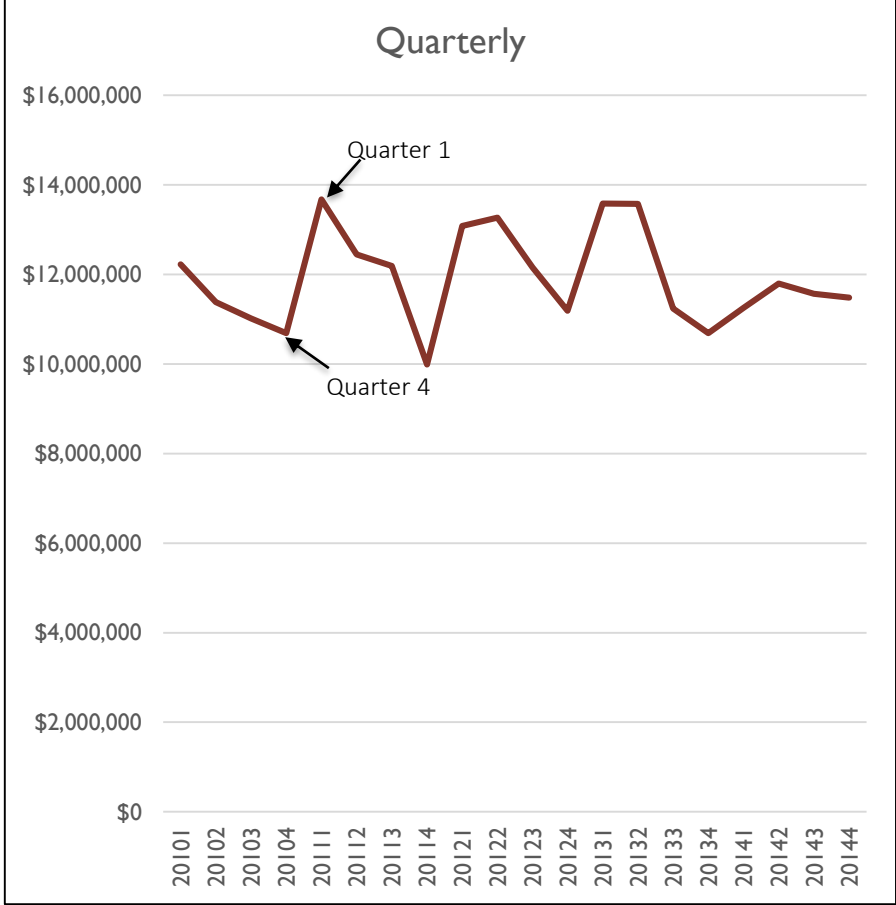
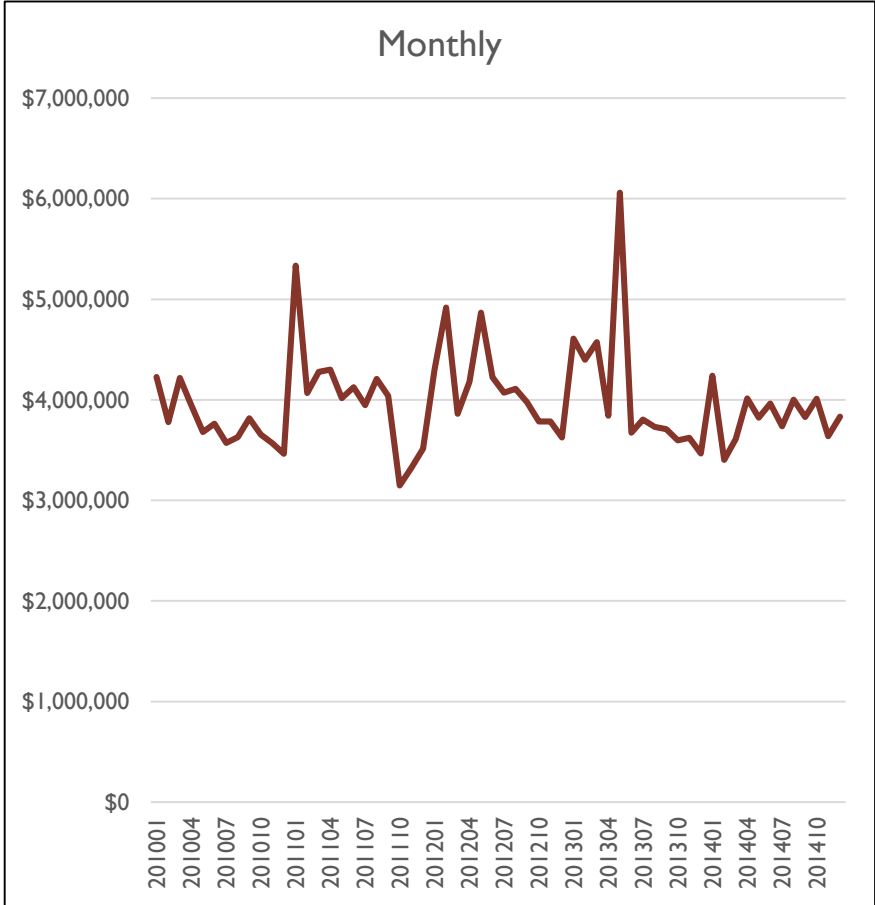
Volatility in Sales Tax Revenues

Monthly variation in revenues

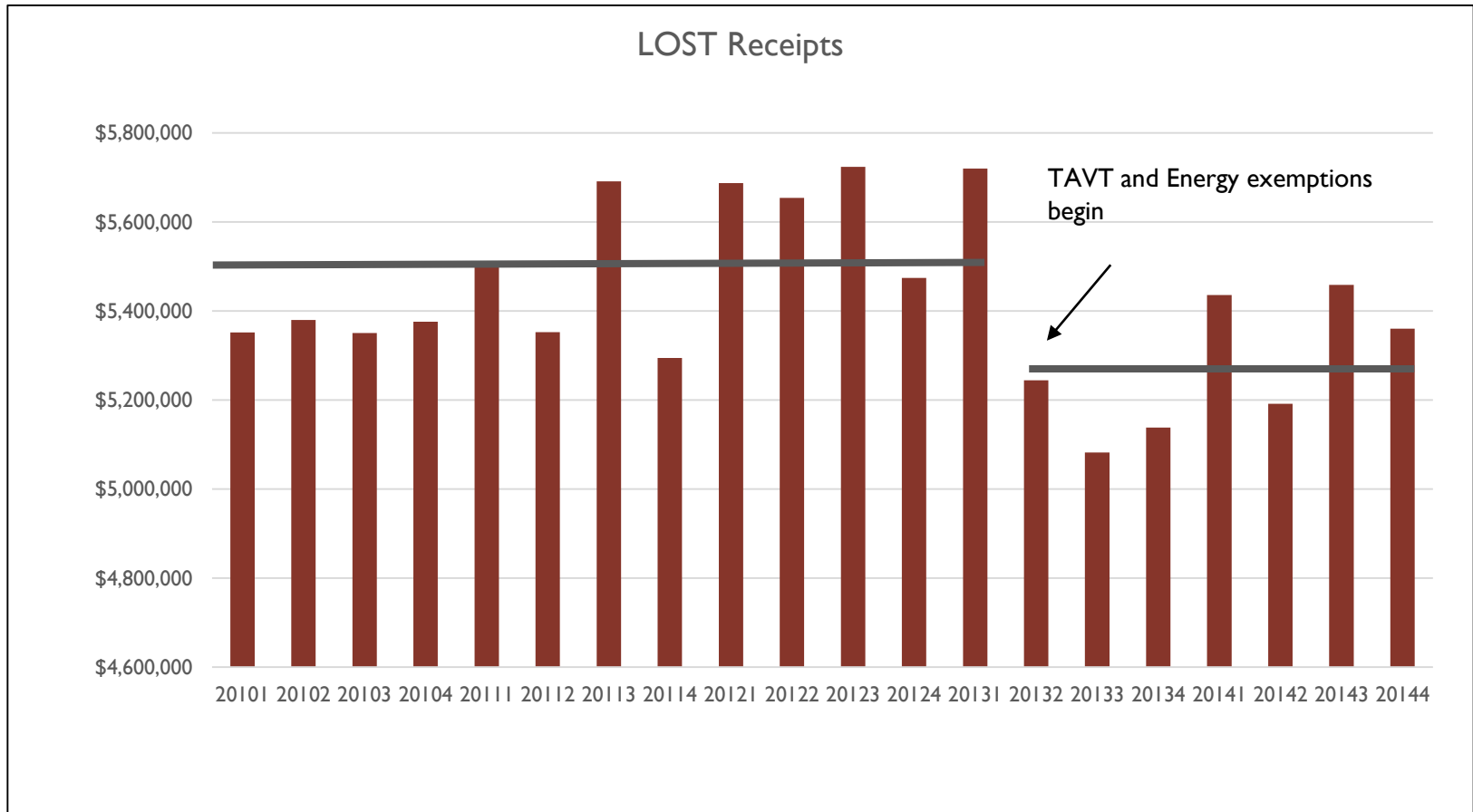
Legislative changes in base

Changes in consumption patterns over time

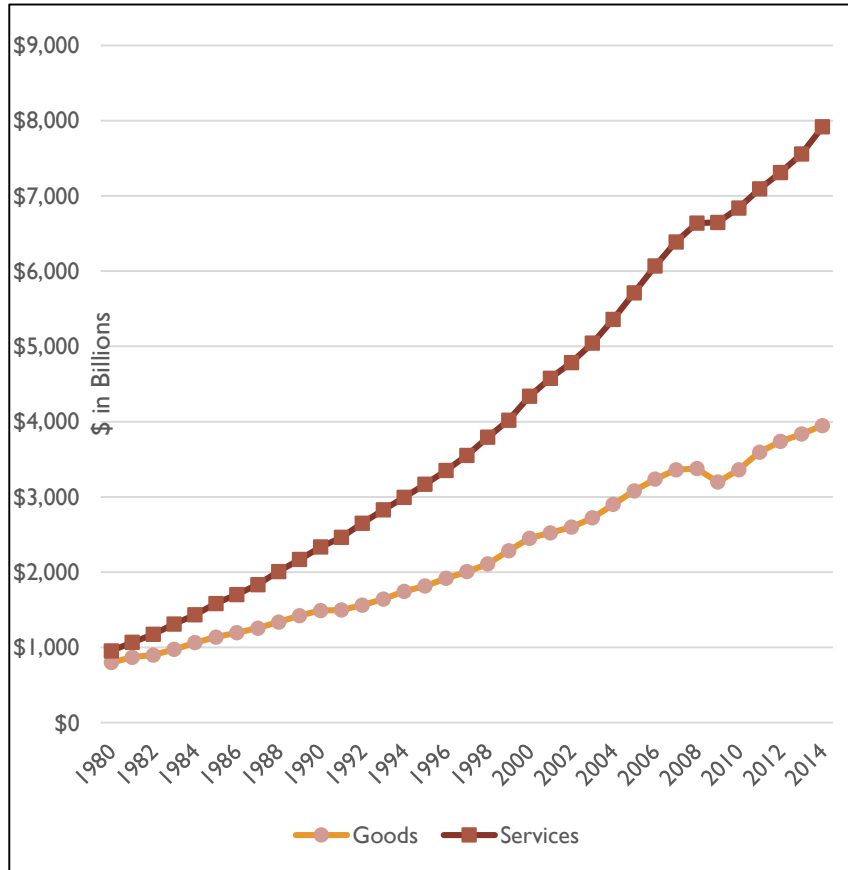
Monthly vs Quarterly Variation



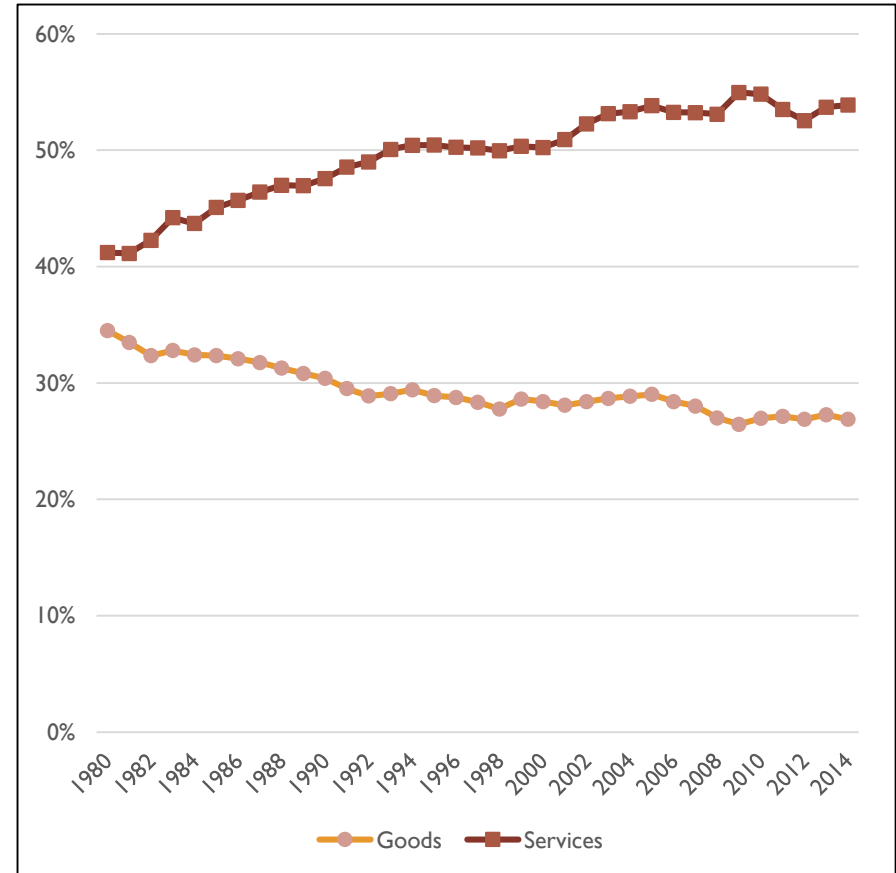
Elimination of Sales Tax on MV and Energy Used in Agriculture and Manufacturing



U.S. Consumption in Goods and Services, 1980-2014



U.S. Consumption in Goods and Services per \$ of Personal Income, 1980-2014



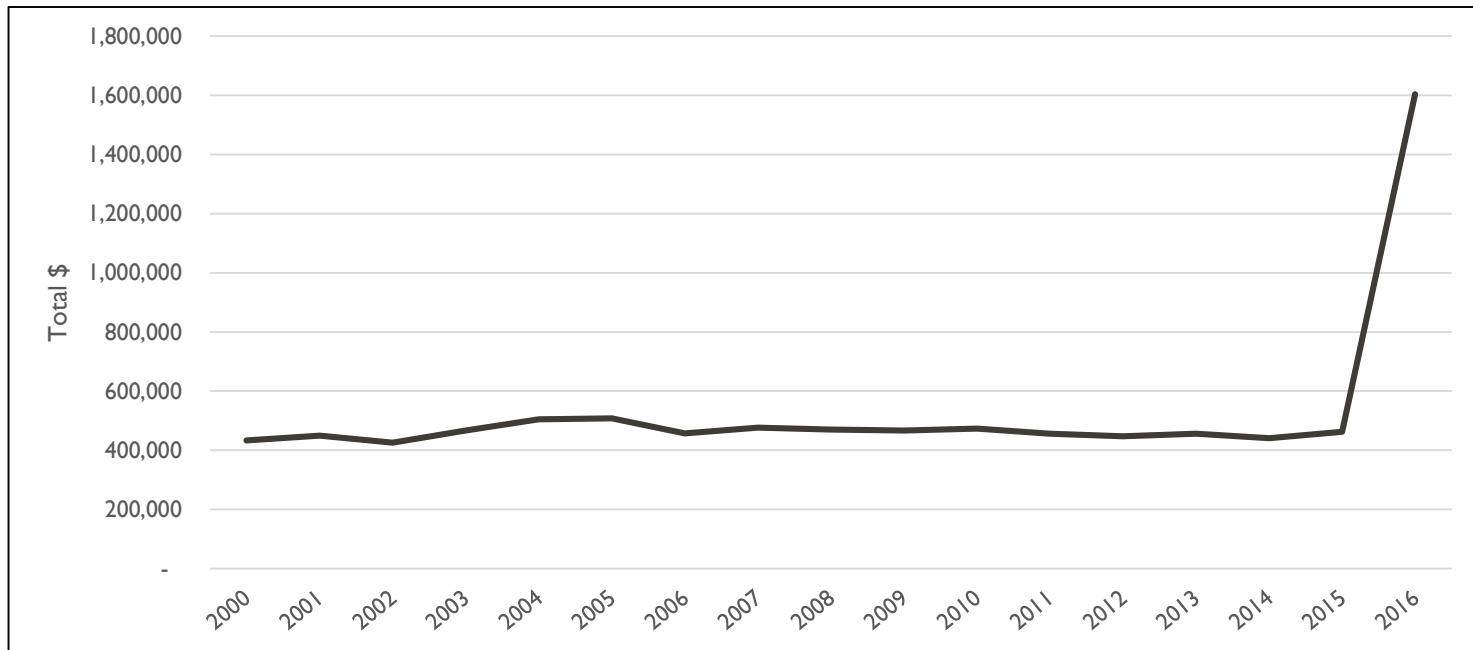


Volatility in Motor Fuel Revenues

Legislative changes in base – HB 170

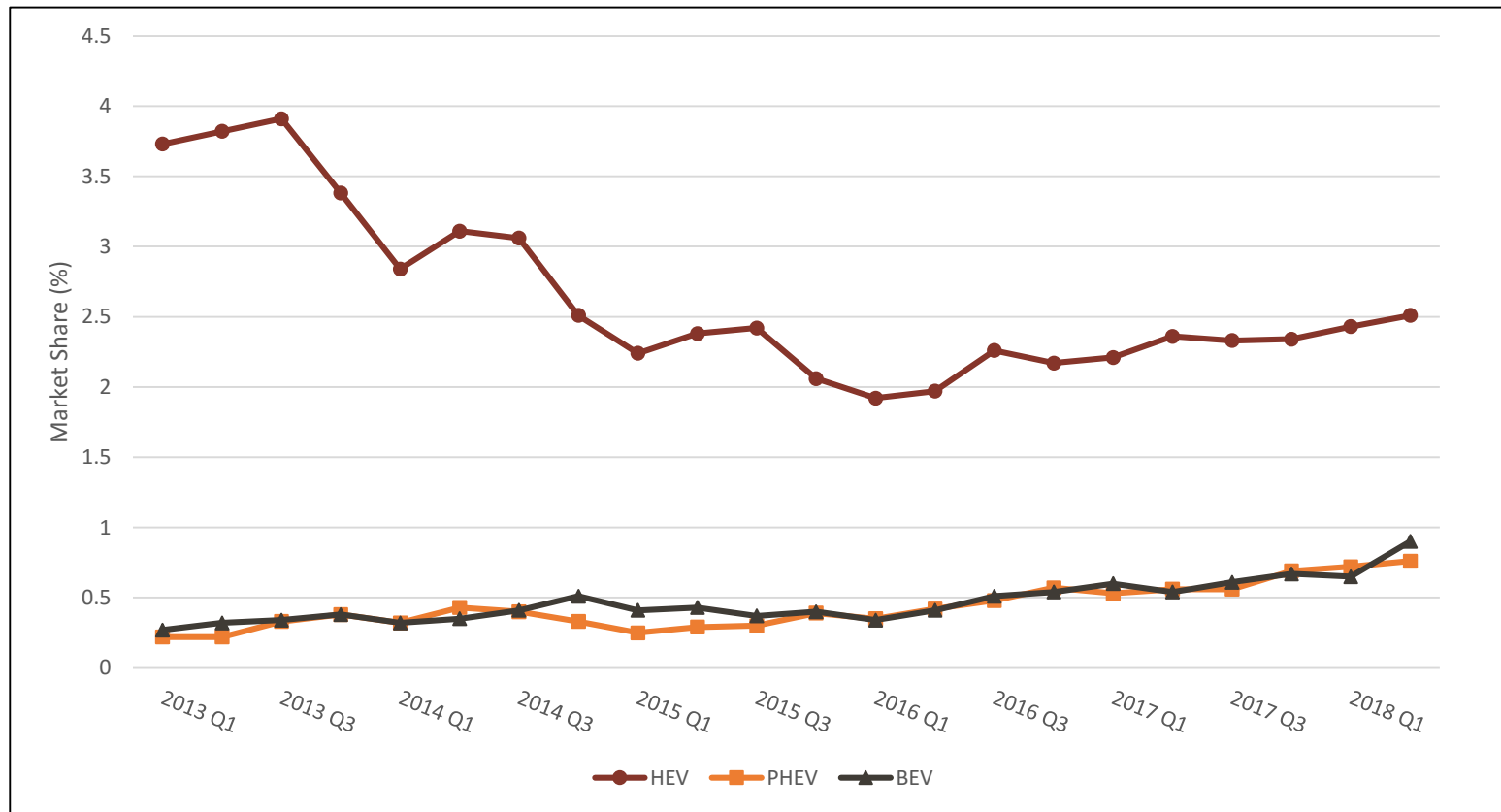
Changes in vehicle technology

Georgia Motor Fuel Receipts, 2000-2016



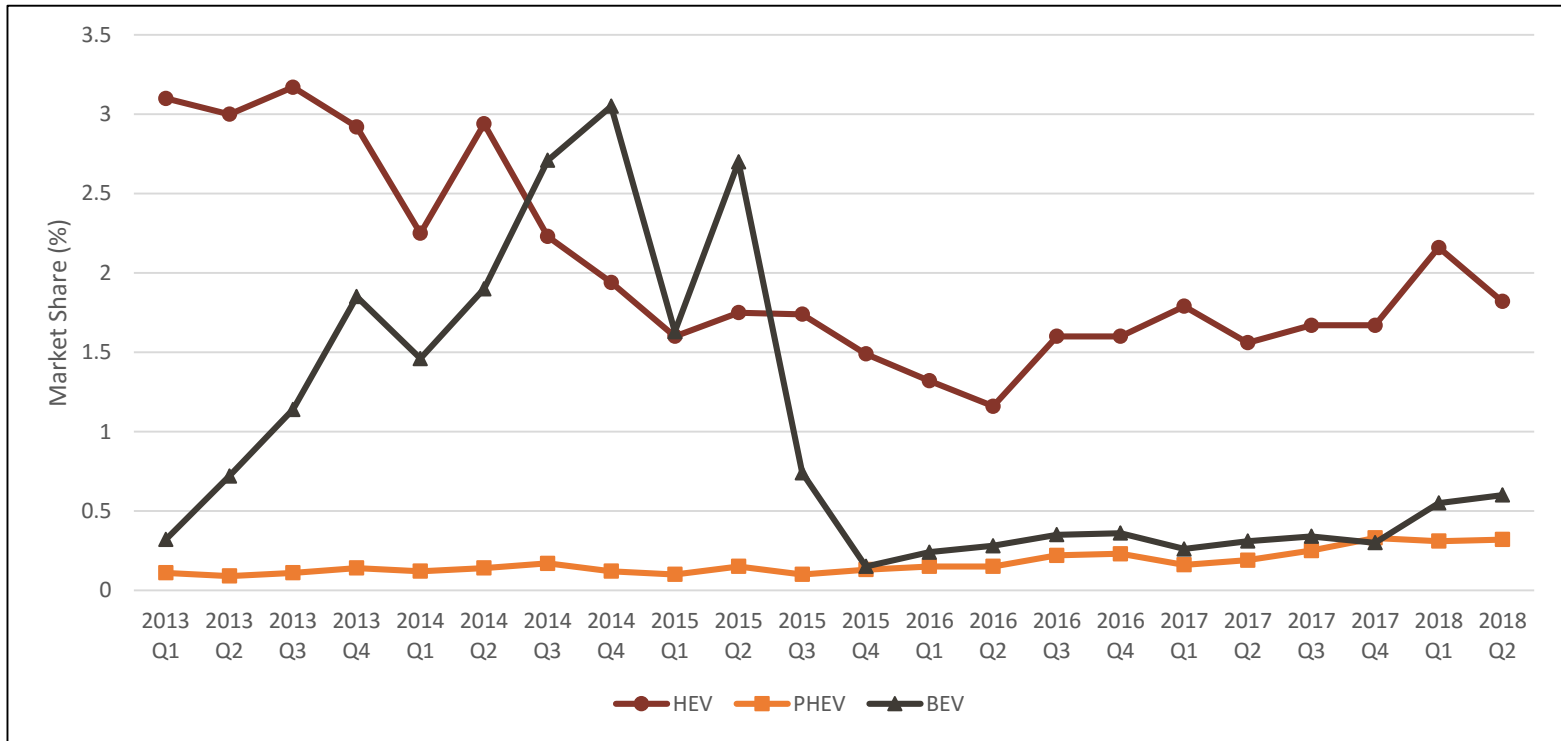
Source: Federal Highway Administration data, Table MF-1, various years. Motor fuel receipts excludes refunds but includes deductions by distributors for expenses. Receipts shown above do not include other related motor vehicle receipts.

US Market Share of EVs by type, 2013 – Q2 2018 (%)



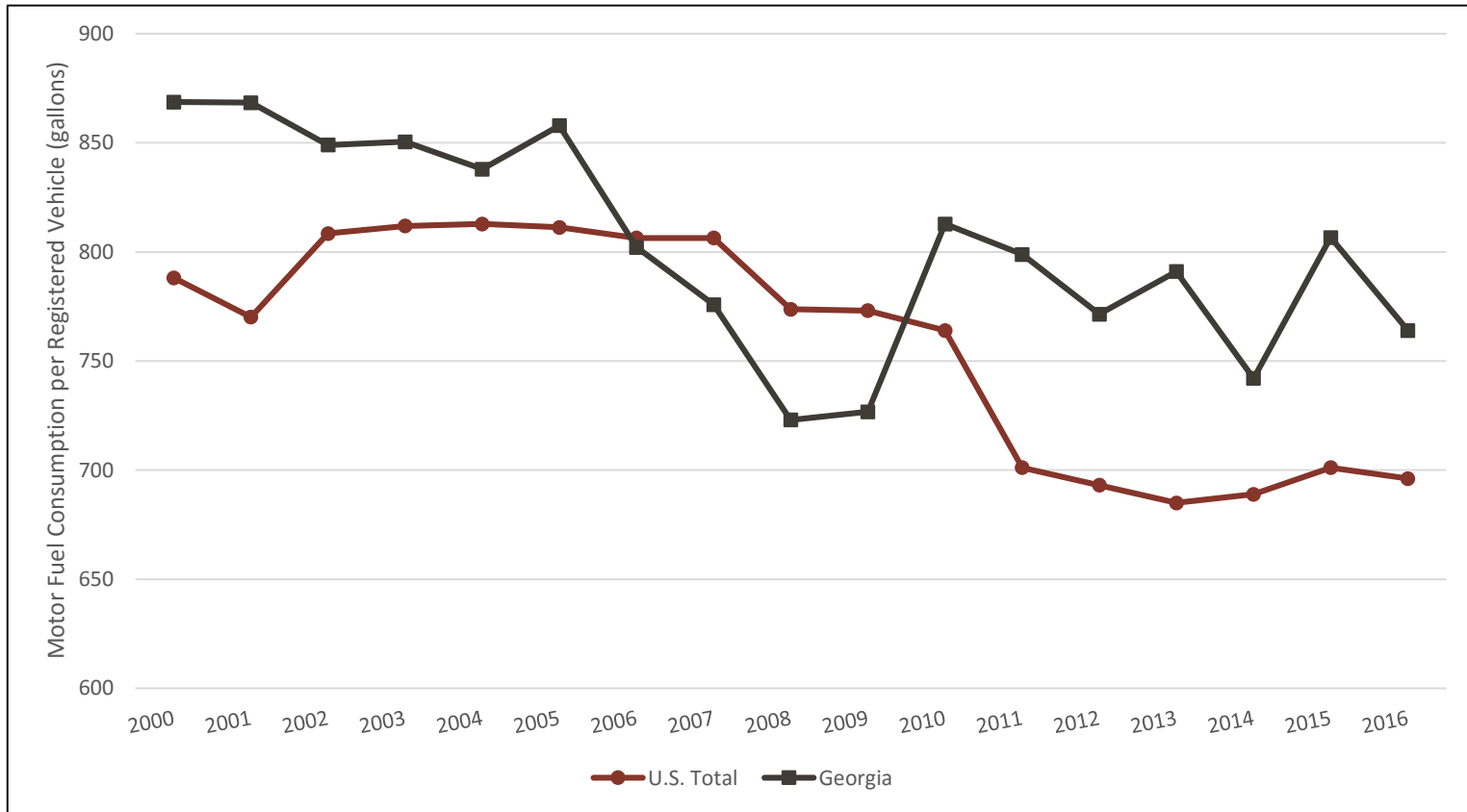
Source: Auto Alliance: U.S. Light-Duty ATV Sales

Market Share of EVs by Type in Georgia, 2013 – Q2 2018



Source: Auto Alliance: U.S. Light-Duty ATV Sales

Motor fuel consumption per registered vehicle, 2000-2016




Source: Computed by author. Federal Highway Administration data, Table MF-33GA, Table MF-33SF, and Table MV-1, various years.



Forecasting vs Predictive Analytics

Forecasting is based on past trends and behavior

Predictive analytics uses machine learning to reveal additional insights into forecast drivers



Are forecasts useful to policymakers and to the policy making process?

Informed estimation is better than uninformed estimation.

Even though forecasts are subject to margins of error, they have the ability to guide policy makers.



It's tough to make predictions, especially about
the future.

(Yogi Berra)

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Thank You
and
Happy Forecasting!!