Energy Information Administration's Short-Term Energy Outlook Motor Gasoline Model

For

EIA Short-Term Domestic Gasoline Consumption Modeling Workshop

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By

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EIA Short-Term Energy Outlook Motor Gasoline Consumption Model

- Model consists of two estimating equations

  - Highway travel per capita (age group 15-64)

  - Fleet-wide fuel economy

- Dividing highway travel projections by fuel economy projections yields projections of motor gasoline consumption

- Projections run through the end of the following calendar year (currently through 2018)

Highway travel equation

- **Key independent variables**
    - Real cost to drive per mile (gasoline price)
    - Employment
    - Share of total population age 65+
    - Dummy trend variable for post-2013

- **EIA has not been able to identify reason for post-2013 shift**

Dependent Variable: LOG(MVVMPUS_SA/POP_1564)
Method: Least Squares
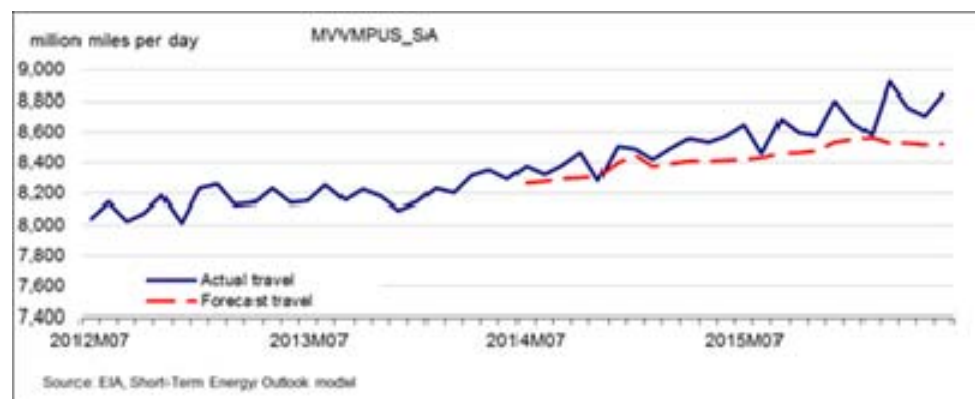Date: 09/13/16   Time: 14:37
Sample: 2005M01 2016M06
Included observations: 138

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.565441	0.062478	57.06723	0.0000
LOG(POP_65/POP)	-0.203414	0.023131	-8.794110	0.0000
LOG(CPM_SA)	-0.030990	0.006500	-4.767978	0.0000
LOG(EMNFPUS/POP_1564)	0.565568	0.031376	18.02566	0.0000
LOG(ZWHDDUS1/ZSAJQUS)*(DEC+JAN+...	-0.001296	0.000562	-2.304376	0.0228
D0712	-0.033838	0.008459	-4.000225	0.0001
D08	-0.021092	0.002762	-7.635453	0.0000
D0801	0.026820	0.008580	3.125825	0.0022
D0901	-0.022526	0.008351	-2.697262	0.0079
D0903	-0.033447	0.008331	-4.014890	0.0001
D1212	-0.020590	0.008310	-2.477822	0.0145
D14ON*@TREND(2013:12)	0.000980	0.000258	3.791129	0.0002

R-squared	0.911952	Mean dependent var		3.680743
Adjusted R-squared	0.904265	S.D. dependent var		0.025969
S.E. of regression	0.008035	Akaike info criterion		-6.727059
Sum squared resid	0.008135	Schwarz criterion		-6.472515
Log likelihood	476.1670	Hannan-Quinn criter.		-6.623618
F-statistic	118.6394	Durbin-Watson stat		2.039498
Prob(F-statistic)	0.000000			

Highway travel projections

- EIA conducted an out-of-sample forecast using a estimation period of from 2005 through mid-2014.The post-2013 dummy variable was excluded, and the out-of-sample forecast was run from July 2014-June 2015 and July 2015 –June 2016

    - 7/14 – 6/15 under-prediction: 1.1%
    - 7/15 – 6/16 under-prediction: 2.6%

Fuel economy equation

- Key independent variables
  - Trend variable
  - Real price of gasoline

Dependent Variable: MPG_SA
Method: Least Squares
Date: 08/31/16   Time: 14:16
Sample: 2005M01 2016M06
Included observations: 138

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	21.12383	0.110351	191.4245	0.0000
D09ON*@TREND(2008:12)	0.011986	0.000621	19.30276	0.0000
D0501	-0.615676	0.215287	-2.859795	0.0050
D0607	-0.547424	0.213557	-2.563363	0.0115
D0712	-0.608569	0.213396	-2.851825	0.0051
D0809	0.912052	0.215315	4.235893	0.0000
D1108+D1109+D1110+D1111+D1112	0.402937	0.098836	4.076842	0.0001
D12	0.397946	0.071962	5.529929	0.0000
D1202	-0.809315	0.221011	-3.661885	0.0004
MGRARUS/CICPIUS	0.001749	0.000810	2.158738	0.0327

R-squared	0.813358	Mean dependent var		21.74749
Adjusted R-squared	0.800234	S.D. dependent var		0.473377
S.E. of regression	0.211577	Akaike info criterion		-0.198754
Sum squared resid	5.729884	Schwarz criterion		0.013366
Log likelihood	23.71401	Hannan-Quinn criter.		-0.112554
F-statistic	61.97813	Durbin-Watson stat		1.994038
Prob(F-statistic)	0.000000			

Fuel economy projections

- EIA conducted an out of sample forecast for fuel economy similar to the one done for highway travel

  – 7/14 – 6/15 over-prediction: 0.1%

  – 7/15 – 6/16 over-prediction: 0.2%