

Notes on the Automobile Inventory-to-Sales Ratio Forecast

March 2017

Kara Naccarelli

Moody's Analytics introduced a new forecast for the automobile inventory-to-sales ratio (FSCARD). The inventory-to-sales ratio for automobiles—and indeed for anything—depends on two factors: the rate at which the product is produced and sold. The new equation captures this conceptual definition through its regressors. On the supply side, lagged vehicle production is used rather than the contemporaneous value because the lagged variant proved statistically significant and carried the correct coefficient. On the demand side, contemporaneous vehicle sales are used. While the demand side can adjust very rapidly, this framework assumes that supply side decisions are made with a one-period lag to capture the delay between changing market conditions and the response of businesses.

The equation also features a lagged dependent variable term. Performing a Breusch-Godfrey LM test revealed that the null hypothesis of no serial correlation could be rejected soundly. Because of this finding, and because of the presence of a lagged dependent variable term, Moody's Analytics chose to include a one-period auto regressive term. Not doing so would have exaggerated the parameter estimates of the regression equation. Moody's Analytics did not include any further demand or supply side drivers, as doing so would have resulted in multicollinearity.

Equation specification

Dependent variable: FSCARD_US

Method: ARMA generalized least squares (Gauss-Newton)

Date: 03/10/17 Time: 08:31

Sample: 1993Q3 2016Q3

Included observations: 93

Convergence achieved after 7 iterations

Coefficient covariance computed using outer product of gradients

d.f. adjustment for standard errors & covariance

Variable	Coefficient	Std. error	t-Statistic	Prob.
C	0.484008	0.213933	2.262426	0.0261
FSCARD_US(-1)	0.813779	0.082905	9.815811	0.0000
DLOG(FRVEHL_US)	-3.602150	0.321594	-11.20094	0.0000
DLOG(FIP3361_US(-2))	0.599738	0.237907	2.520892	0.0135
AR(1)	0.262165	0.142316	1.842129	0.0688
R-squared	0.805735	Mean dependent var		2.560771
Adjusted R-squared	0.796905	S.D. dependent var		0.362855
S.E. of regression	0.163524	Akaike info criterion		-0.730682
Sum squared resid	2.353134	Schwarz criterion		-0.594521
Log likelihood	38.97671	Hannan-Quinn criter.		-0.675704
F-statistic	91.24765	Durbin-Watson stat		1.820224
Prob(F-statistic)	0.000000			
Inverted AR Roots	.26			

*Mnemonics referenced in the above equation, e.g. FET, can be defined using the Mnemonic 411 feature on DataBuffet. Please contact Help@economy.com for assistance.