Macroeconomic Models: Weekly Update

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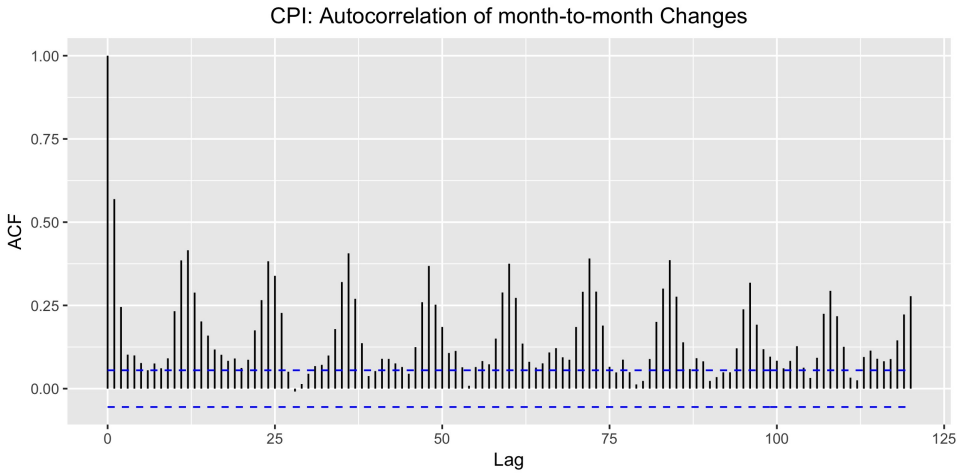
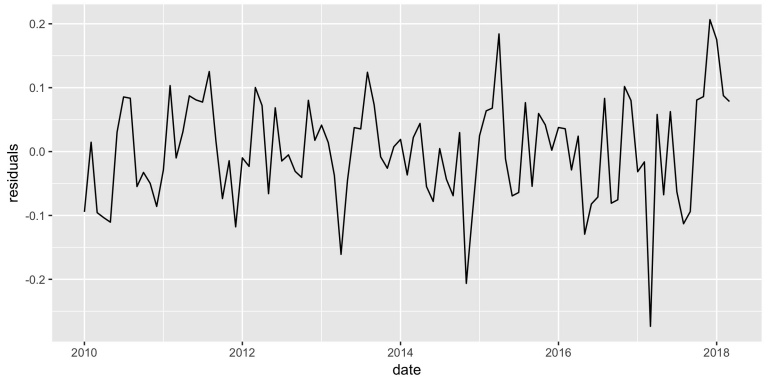
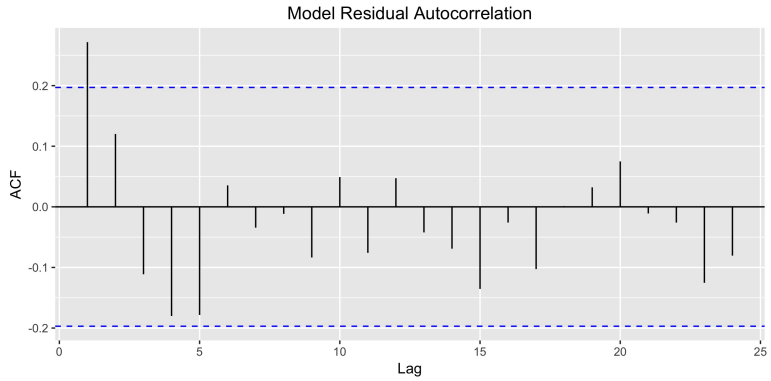
- Pretty easy to see the **strong** seasonality in the ACF of CPI's month-to-month changes.



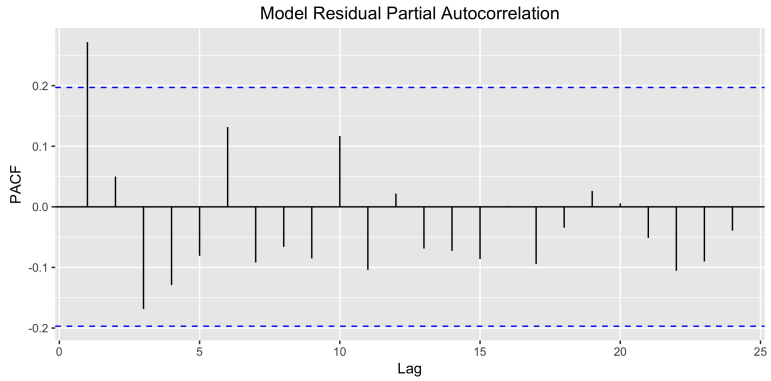
- Linear regression model residuals:



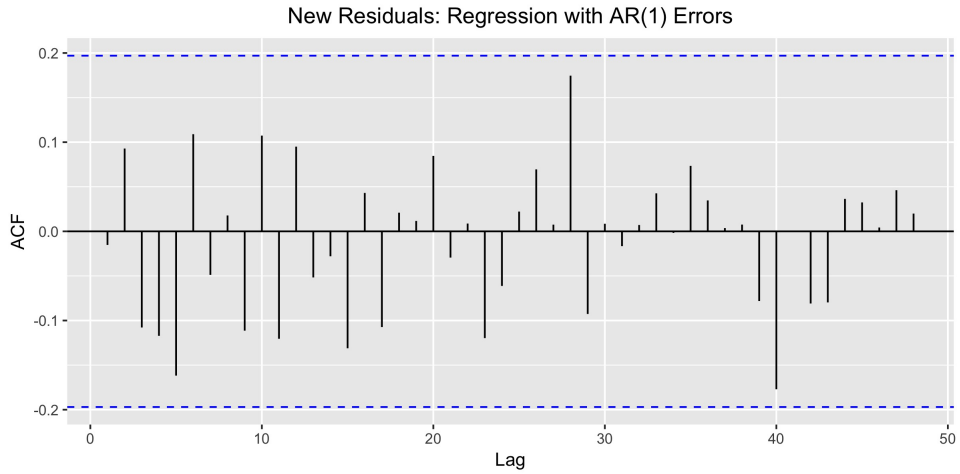
- Model residuals: empirical autocorrelation function (ACF) plot.



- Model residuals: empirical partial autocorrelation function (ACF) plot.



- `auto.arima()` ranks a simple AR(1) as the top SARMIA model for the residuals. I modeled the linear regression residuals as AR(1), and the following plot shows the ACF for the (new) resulting residuals.



- HOWEVER... dividing the data into training and testing subsets gives a different result; the training set residuals do not show enough autocorrelation to justify modeling them as AR(1).

- Last month's CPI change is not a sifnificant predictor of this month's CPI change; see last row, starred for visibility:

```
lm(formula = CPI ~ ., data = select(reg_dat, -date))

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.0405137  0.0435696   0.930 0.355550
SETB         0.0423077  0.0009428  44.877  < 2e-16
SEHB         0.0196479  0.0036115   5.440 6.96e-07
.
.
.
SEHJ         0.0258326  0.0180102   1.434 0.155806
last_month   0.0026682  0.0196039   0.136 0.892119 (****)
---

Residual standard error: 0.09496 on 72 degrees of freedom
Multiple R-squared:  0.9866,Adjusted R-squared:  0.9817
F-statistic: 203.1 on 26 and 72 DF,  p-value: < 2.2e-16
```

- The same is true of the CPI change 12 months before.

```
lm(formula = CPI ~ ., data = select(reg_dat, -date))

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.0450185  0.0424584   1.060 0.292554
SETB         0.0423946  0.0009511  44.574  < 2e-16
SEHB         0.0199526  0.0036733   5.432 7.20e-07
.
.
.
SEHJ         0.0257108  0.0178891   1.437 0.154984
lag12_delta -0.0062173  0.0197272  -0.315 0.753550 (****)
---

Residual standard error: 0.09491 on 72 degrees of freedom
Multiple R-squared:  0.9866,Adjusted R-squared:  0.9817
F-statistic: 203.4 on 26 and 72 DF,  p-value: < 2.2e-16
```

Relative Importance Weights

- https://www.bls.gov/cpi/tables/relative-importance/home.htm