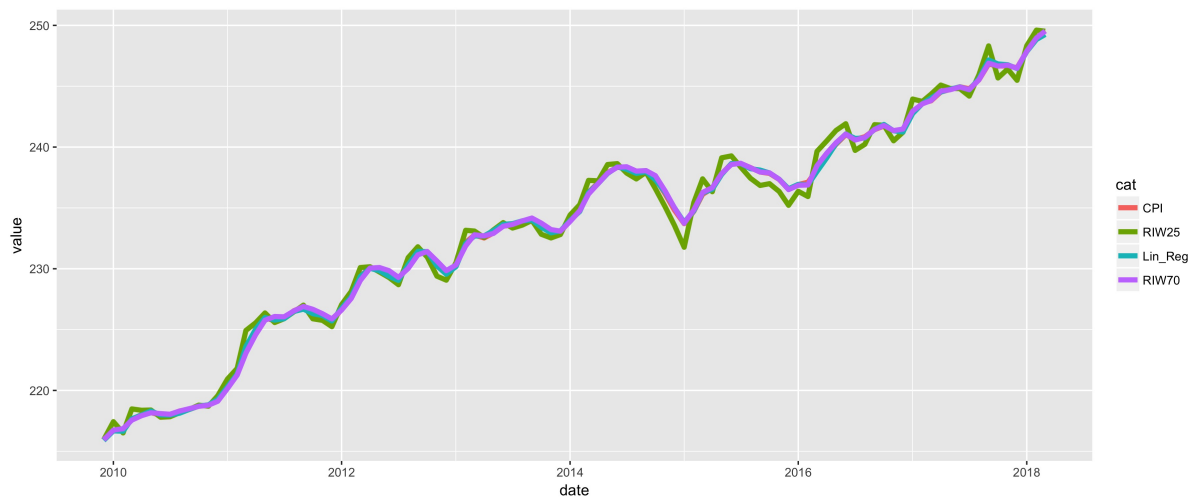# Macroeconomic Models:
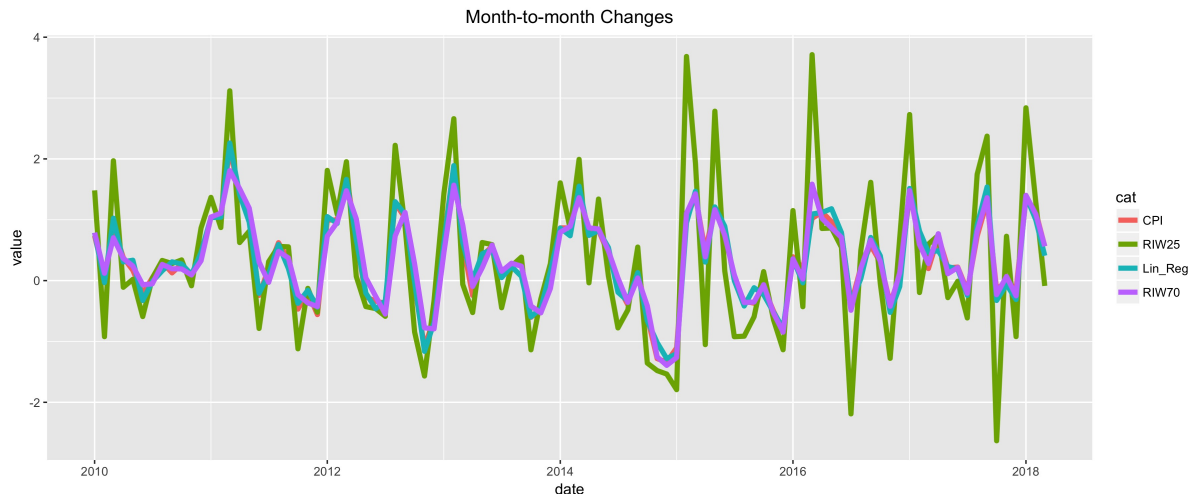# Weekly Update

Chris Comiskey, Open Data Group

May 14, 2018

It was a week of incremental improvements...

Corrected CPI Calculations

- $R_{25}^2 = 0.9937$

- $R_{70}^2 = 0.9997$

- $R_{\text{LinReg}}^2 = 0.9998$

- The distinct lines are easier to see on a plot of month-to-month differences.

Month-to-month Changes

- $R^2_{25} = -0.21$

- $R^2_{70} = 0.94$

- $R^2_{\text{LinReg}} = 0.97$

- This indicates that the changing weights account for this lost $\approx 6\%$ variation.

Corrected Relative Importance Weights

- Relative expenditure weights change as prices change. Consider a simplified basket of two items:

  - Month 1

    * Prices
      Item A: \$30
      Item B: \$70

    * Relative importance weights
      Item A: 30%
      Item B: 70%

  - Month 2

    * Prices
      Item A: \$35
      Item B: \$70

    * NEW relative importance weights
      Item A: 100*(35/105) = 33.33%
      Item B: 100*(70/105) = 66.67%

- Key formulas, for strata i and time t:

$$\text{CPI}_t = \text{CPI}_{t-1}\left(\sum_i\left[\text{RIW}_{i,t-1}\left(\frac{\text{Strata}_{i,t}}{\text{Strata}_{i,t-1}}\right)\right]\right)$$

$$\text{RIW}_{t,\text{U}} = \text{RIW}_{t-1}\left(\frac{\text{Strata}_t}{\text{Strata}_{t-1}}\right) \text{ then normalize...} \quad \frac{\text{RIW}_{t,\text{N}}}{100} = \frac{\text{RIW}_{t,\text{U}}}{\text{CPI}_t/\text{CPI}_{t-1} \times 100}$$

- I calculated the 2010 - 2011 weights by hand—with the December 2009 published weights—and calculated the CPI with those weights and all 68 strata subindices.

CPI Month-to-month Change Estimates with Calculated Weights