Macroeconomic Models:
Weekly Update

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- Discussing things this week, it was noted that the BLS does not provide RIWs for ELIs; for aggregating to strata indices.

- With the previous bullet in mind, recall Motor Fuel, the Expenditure Class which we saw last week "explains" the most CPI month-to-month variation [1]. Using this EC for an example.

- Consider regressing the Gasoline strata[2] (subindex of Motor Fuel EC) on its three ELIs (i) Regular Unleaded Gasoline; (ii) Mid-grade Unleaded Gasoline; and (iii) Premium Unleaded Gasoline.

$$\text{Gas}_i = \beta_0 + \beta_1 \text{Regular}_i + \beta_2 \text{Mid}_i + \beta_1 \text{Premium}_i + \epsilon_i$$

This regression gives helpful results.

```
Call:
lm(formula = diff(gas) ~ diff(reg) + diff(mid) + diff(prem),
    data = g)
Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) -0.004356   0.006727   -0.648    0.518
diff(reg)    0.748003   0.009953   75.154   <2e-16 ***
diff(mid)    0.089597   0.008671   10.333   <2e-16 ***
diff(prem)   0.166801   0.009188   18.155   <2e-16 ***
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Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1   1

Multiple R-squared:  0.9999,Adjusted R-squared:  0.9999
F-statistic: 1.148e+06 on 3 and 289 DF,  p-value: < 2.2e-16
```

- Two points worth mentioning:

  1. $R^2 \approx 1$, indicating that a linear combination of the ELIs explains the variation in the strata index.
  2. $\sum_i \beta_i \approx 1$, as RIWs would sum to one.

Together these points suggest such a regression provides estimates of the missing RIWs for aggregating ELIs to strata level indices.

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[1] according to R^2 of a simple linear regression of every EC individually
[2] The month-to-month changes in the Gasoline Strata.