Beck and Katz (2014): Table 2, Column 1 replication

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I grabbed the archived datafile from https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/27269 . I then fit the models various ways. A summary table of rounded coefficients appears at the end.

```
library(tidyverse)
```

```
## Loading tidyverse: ggplot2
## Loading tidyverse: tibble
## Loading tidyverse: tidyr
## Loading tidyverse: readr
## Loading tidyverse: purrr
## Loading tidyverse: dplyr
```

```
## Conflicts with tidy packages ----------------------------------------------
```

```
## filter(): dplyr, stats
## lag():    dplyr, stats
```

```
library(haven)
dat <- read_dta("garrett1998.dta")
```

Here column one using LSDV:

```
m1 <- lm(gdp ~ 0 + demand + trade + capmob + oild + per6673 +
               corp + leftlab + clint + as.factor(country) , data=dat)
summary(m1)
```

```
##
## Call:
## lm(formula = gdp ~ 0 + demand + trade + capmob + oild + per6673 +
##     corp + leftlab + clint + as.factor(country), data = dat)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -6.0196 -1.1798 -0.0052  1.2802  5.5709
##
## Coefficients:
##                          Estimate Std. Error t value Pr(>|t|)
## demand                   0.006683   0.001106   6.040 4.17e-09 ***
## trade                   -0.015914   0.015611  -1.019 0.308755
## capmob                  -0.165178   0.223628  -0.739 0.460663
## oild                    -8.536994   6.329907  -1.349 0.178371
## per6673                  1.681897   0.329324   5.107 5.56e-07 ***
## corp                     0.009285   0.624475   0.015 0.988146
## leftlab                 -0.850667   0.421491  -2.018 0.044381 *
## clint                    0.311131   0.151694   2.051 0.041057 *
## as.factor(country)2      2.559702   1.311005   1.952 0.051732 .
## as.factor(country)20     3.060575   1.549168   1.976 0.049035 *
## as.factor(country)200    1.545823   1.899973   0.814 0.416463
## as.factor(country)210    2.141686   2.144175   0.999 0.318609
## as.factor(country)211    1.796319   2.579321   0.696 0.486652
```

```
## as.factor(country)220  3.649520   1.072664   3.402 0.000751 ***
## as.factor(country)260  1.580112   2.370279   0.667 0.505474
## as.factor(country)305  0.906183   2.926455   0.310 0.757022
## as.factor(country)325  2.503913   2.052950   1.220 0.223468
## as.factor(country)375  2.655457   2.408116   1.103 0.270961
## as.factor(country)380  0.432087   2.629569   0.164 0.869582
## as.factor(country)385  2.116166   2.624454   0.806 0.420639
## as.factor(country)390  0.867196   2.610710   0.332 0.739974
## as.factor(country)740  5.572571   1.480097   3.765 0.000197 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.905 on 328 degrees of freedom
## Multiple R-squared:  0.7937, Adjusted R-squared:  0.7798
## F-statistic: 57.35 on 22 and 328 DF,  p-value: < 2.2e-16
```

Here is usual centering approach:

```
m2 <- lm(gdp ~ 0 + demand + trade + capmob + oild + per6673 +
               corp + leftlab + clint,
         data=dat %>% group_by(country) %>% mutate_at(vars(gdp,demand,trade,capmob,
                                     oild,per6673,corp,
                                     leftlab,clint),
                                     function(x) x - mean(x)))
summary(m2)
```

```
##
## Call:
## lm(formula = gdp ~ 0 + demand + trade + capmob + oild + per6673 +
##     corp + leftlab + clint, data = dat %>% group_by(country) %>%
##     mutate_at(vars(gdp, demand, trade, capmob, oild, per6673,
##         corp, leftlab, clint), function(x) x - mean(x)))
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -6.0196 -1.1798 -0.0052  1.2802  5.5709
##
## Coefficients:
##          Estimate Std. Error t value Pr(>|t|)
## demand   0.006683   0.001084   6.168 1.95e-09 ***
## trade   -0.015914   0.015288  -1.041   0.2986
## capmob  -0.165178   0.219003  -0.754   0.4512
## oild    -8.536994   6.198994  -1.377   0.1694
## per6673  1.681897   0.322513   5.215 3.19e-07 ***
## corp     0.009285   0.611559   0.015   0.9879
## leftlab -0.850667   0.412774  -2.061   0.0401 *
## clint    0.311131   0.148557   2.094   0.0370 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.866 on 342 degrees of freedom
## Multiple R-squared:  0.336,  Adjusted R-squared:  0.3204
## F-statistic: 21.63 on 8 and 342 DF,  p-value: < 2.2e-16
```

Here is the center-and-then-construct-the-interaction-approach:

```
m3 <- lm(gdp ~ 0 + demand + trade + capmob + oild + per6673 +
              corp + leftlab + leftlab*corp  ,
         data=dat %>% group_by(country) %>% mutate_at(vars(gdp,demand,trade,capmob,
                                     oild,per6673,corp,
                                     leftlab,clint),
                                  function(x) x - mean(x)))
summary(m3)
```

```
##
## Call:
## lm(formula = gdp ~ 0 + demand + trade + capmob + oild + per6673 +
##     corp + leftlab + leftlab * corp, data = dat %>% group_by(country) %>%
##     mutate_at(vars(gdp, demand, trade, capmob, oild, per6673,
##         corp, leftlab, clint), function(x) x - mean(x)))
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -6.1020 -1.2494  0.0294  1.2454  5.5448
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## demand        0.00656    0.00109   6.020  4.5e-09 ***
## trade        -0.01827    0.01534  -1.190    0.235
## capmob       -0.18693    0.22015  -0.849    0.396
## oild         -7.86155    6.25254  -1.257    0.209
## per6673       1.75550    0.32365   5.424  1.1e-07 ***
## corp          0.53744    0.56896   0.945    0.346
## leftlab      -0.07519    0.18306  -0.411    0.682
## corp:leftlab  0.09667    0.65004   0.149    0.882
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.878 on 342 degrees of freedom
## Multiple R-squared:  0.3275, Adjusted R-squared:  0.3118
## F-statistic: 20.82 on 8 and 342 DF,  p-value: < 2.2e-16
```

Here the point estimates after applying my best guess as to how the publisher rounded in the published table:

```
res <- apply(cbind(coef(m1)[1:8],coef(m2),coef(m3)),c(1,2),
      function(x) {
        rt <- as.integer(cut(abs(x),c(0,0.01,1,Inf)))
        signif(x,rt)
      })
res <- cbind(res,c(0.007,-0.018,-0.20,-7.86,1.76,
                   0.54,-0.075,0.10))
colnames(res) <- c("LSDV","CenterAll","CenterThenInt","Reported")
res
```

```
##           LSDV CenterAll CenterThenInt Reported
## demand   0.007     0.007         0.007    0.007
## trade   -0.016    -0.016        -0.018   -0.018
## capmob  -0.170    -0.170        -0.190   -0.200
## oild    -8.540    -8.540        -7.860   -7.860
## per6673  1.680     1.680         1.760    1.760
## corp     0.009     0.009         0.540    0.540
```

```
## leftlab -0.850    -0.850        -0.075   -0.075
## clint    0.310     0.310         0.097    0.100
```