Problem Set 10

Econometrics

3

```
library(stats)
library(AER)
```

```
## Loading required package: car
```

```
## Loading required package: carData
```

```
## Loading required package: lmtest
```

```
## Loading required package: zoo
```

```
##
## Attaching package: 'zoo'
```

```
## The following objects are masked from 'package:base':
##
##     as.Date, as.Date.numeric
```

```
## Loading required package: sandwich
```

```
## Loading required package: survival
```

```
load("Angrist804049.Rda")


Angrist804049$YOB <- factor(Angrist804049$YOB)
Angrist804049$QOB <- factor(Angrist804049$QOB)


dummies <- model.matrix(~ QOB - 1, data = Angrist804049)
```

```r
dummies <- as.data.frame(dummies)
colnames(dummies) <- c("Q1", "Q2", "Q3", "Q4")
Angrist804049 <- cbind(Angrist804049, dummies)

dummies <- model.matrix(~ YOB - 1, data = Angrist804049)
dummies <- as.data.frame(dummies)
Angrist804049 <- cbind(Angrist804049, dummies)

yob_dummies <- paste0("YOB", unique(Angrist804049$YOB))
interactions <- c()
for (yob in yob_dummies) {
    for (q in c("Q1", "Q2", "Q3")) {
        interactions <- c(interactions, paste0(yob, ":", q))
    }
}
interactions <- paste(interactions, collapse = " + ")
yob_dummies <- paste(yob_dummies, collapse = " + ")

formula <- as.formula(paste(
    "LWKLYWGE ~ EDUC + RACE + MARRIED + SMSA + NEWENG +
    MIDATL + ENOCENT + WNOCENT + SOATL + ESOCENT + WSOCENT + MT + AGE + AGEQ +",
    yob_dummies,
    "| RACE + MARRIED + SMSA +
      NEWENG + MIDATL + ENOCENT + WNOCENT + SOATL +
      ESOCENT + WSOCENT + MT + AGE + AGEQ +",
    interactions,
    " + ",
    yob_dummies
))
```

```r
iv_4 <- ivreg(
    formula,
    data = Angrist804049
)

summary(iv_4, diagnostics = TRUE)
```

```
##
## Call:
## ivreg(formula = formula, data = Angrist804049)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -8.76357 -0.22456  0.05882  0.31859  4.77627
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  5.5445390  0.6755234   8.208 2.26e-16 ***
## EDUC         0.0486586  0.0312796   1.556 0.119804
## RACE        -0.2804085  0.0491115  -5.710 1.13e-08 ***
## MARRIED      0.2510388  0.0075648  33.185  < 2e-16 ***
## SMSA        -0.1914562  0.0328539  -5.828 5.63e-09 ***
## NEWENG      -0.1195515  0.0191070  -6.257 3.93e-10 ***
## MIDATL      -0.0623051  0.0216957  -2.872 0.004082 **
## ENOCENT      0.0015817  0.0333955   0.047 0.962224
## WNOCENT     -0.1171270  0.0232131  -5.046 4.52e-07 ***
## SOATL       -0.1549423  0.0345365  -4.486 7.25e-06 ***
## ESOCENT     -0.1864699  0.0522316  -3.570 0.000357 ***
## WSOCENT     -0.1168175  0.0297200  -3.931 8.47e-05 ***
```

```
## MT          -0.0954433  0.0096047  -9.937  < 2e-16 ***
## AGE          0.0004984  0.0040920   0.122 0.903061
## AGEQ        -0.0099145  0.0084351  -1.175 0.239840
## YOB33        0.1009343  0.0379138   2.662 0.007763 **
## YOB37        0.0517253  0.0167683   3.085 0.002038 **
## YOB35        0.0711636  0.0270949   2.626 0.008628 **
## YOB38        0.0444558  0.0126080   3.526 0.000422 ***
## YOB39        0.0272338  0.0086590   3.145 0.001660 **
## YOB36        0.0628687  0.0216559   2.903 0.003695 **
## YOB34        0.0891028  0.0319904   2.785 0.005348 **
## YOB31        0.1223315  0.0486276   2.516 0.011881 *
## YOB30        0.1339155  0.0528012   2.536 0.011206 *
## YOB32        0.1092853  0.0431232   2.534 0.011269 *
##
## Diagnostic tests:
##                     df1    df2 statistic p-value
## Weak instruments     27 330399     1.451  0.0611 .
## Wu-Hausman            1 330424     0.224  0.6362
## Sargan               32     NA    20.554  0.9410
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.6219 on 330425 degrees of freedom
## Multiple R-Squared: 0.1603,  Adjusted R-squared: 0.1602
## Wald test:  1262 on 24 and 330425 DF,  p-value: < 2.2e-16
```