Example 6-1

September 11, 2020

[ ]:
```
# install the following packages and library
install.packages("plm")
install.packages("pder")

library("plm")
```

[3]:
```
##---------------------------------Block 1--------------------------------

#### Example 6-1 ####

## ------------------------------------------------------------------------

# setting up the model. the first formula is by stating the non-endogenous␣
 ↪variable and the instrument
# the second formula is stating the endogenous variable and the instrument
# both formulas do the same thing
y ~ x1 + x2 + x3 | x1 + x3 + z
y ~ x1 + x2 + x3 | . - x2 + z

## ------------------------------------------------------------------------

data("SeatBelt", package = "pder")
# vehicle occupants killed
SeatBelt$occfat <- with(SeatBelt, log(farsocc / (vmtrural + vmturban)))

# run three different models. OLS, fixed effects, and IV fixed effects
ols <- plm(occfat ~ log(usage) + log(percapin) + log(unemp) + log(meanage) +
           log(precentb) + log(precenth)+ log(densrur) +
           log(densurb) + log(viopcap) + log(proppcap) +
           log(vmtrural) + log(vmturban) + log(fueltax) +
           lim65 + lim70p + mlda21 + bac08, SeatBelt,
           effect = "time")
fe <- update(ols, effect = "twoways")
ivfe <- update(fe, . ~ . |  . - log(usage) + ds + dp +dsp)

# show results for all three estimates
# w2sls is the within 2SLS estimated
```

```
rbind(ols = coef(summary(ols))[1,],
      fe = coef(summary(fe))[1, ],
      w2sls = coef(summary(ivfe))[1, ])
```

```
y ~ x1 + x2 + x3 | x1 + x3 + z
```

```
y ~ x1 + x2 + x3 | . - x2 + z
```

	Estimate	Std. Error	t-value	Pr(>|t|)
ols	0.11404316	0.02546722	4.478037	9.252148e-06
fe	-0.05349783	0.02251563	-2.376031	1.789646e-02
w2sls	-0.13335261	0.04482326	-2.975076	2.929161e-03

[4]:
```
##---------------------------------Block 2---------------------------------

# IV fixed effects model for non-occupants killed
SeatBelt$noccfat <- with(SeatBelt, log(farsnocc / (vmtrural + vmturban)))
nivfe <- update(ivfe, noccfat ~ . | .)
coef(summary(nivfe))[1, ]
```

Estimate -0.042372483422834 **Std. Error** 0.103119011370933 **z-value** -0.410908549834854 **Pr(>\textbar{}z\textbar{})** 0.681139592916723