Chapter 11 -

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Exercise 11.10

Upload packages

```
library(wooldridge)
library(lmreg)
```

Upload database

```
data<-wooldridge::phillips

attach(data)
```

(i) Reestimate equation (11.19) and report the results in the usual form. Do the intercept and slope estimates change notably when you add the recent years of data?

```
summary(lm1<-lm(cinf~unem))
```

```
##
## Call:
## lm(formula = cinf ~ unem)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -9.0741 -0.9241  0.0189  0.8606  5.4800
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   2.8282     1.2249   2.309   0.0249 *
## unem         -0.5176     0.2090  -2.476   0.0165 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 2.307 on 53 degrees of freedom
##   (1 observation deleted due to missingness)
## Multiple R-squared:  0.1037, Adjusted R-squared:  0.08679
## F-statistic: 6.132 on 1 and 53 DF,  p-value: 0.0165
```

The estimated equation is expressed as follows

$$\widehat{\Delta inf}_t = 2.82 - 0.51 unem_t$$

The coefficients do not change significantly.

(ii) Obtain a new estimate of the natural rate of unemployment. Compare this new estimate with that reported in Example 11.5.

The natural rate of unemployment is obtained by imposing $\widehat{\Delta inf} = 0$

$$2.82 - 0.51 unem = 0$$

$$unem^* = \frac{2.82}{0.51} = 5.52\%$$

(iii) Compute the first order autocorrelation for `unem`. In your opinion, is the root close to one?

```
acf(unem, pl=FALSE, lag.max = 3)
```

```
##
## Autocorrelations of series 'unem', by lag
##
##     0     1     2     3
## 1.000 0.741 0.501 0.373
```

The first order autocorrelation is equal to 0.741.

(iv) Use `cunem` as the explanatory variable instead of `unem`. Which explanatory variable gives a higher R-squared?

```
summary(lm2<-lm(cinf~cunem))
```

```
##
## Call:
## lm(formula = cinf ~ cunem)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -7.4790 -0.9441  0.1384  1.0889  5.4551
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.07214    0.30584  -0.236  0.81443
## cunem       -0.83281    0.28984  -2.873  0.00583 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 2.267 on 53 degrees of freedom
##   (1 observation deleted due to missingness)
## Multiple R-squared:  0.1348, Adjusted R-squared:  0.1185
## F-statistic: 8.256 on 1 and 53 DF,  p-value: 0.005831
```

In this case, with `cunem` as explanatory variable the R-Squared is higher.