Chapter 10 - Basic Regression Analysis with Time Series Data

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Exercise 10.12

Upload packages

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

Upload database

```
data<-wooldridge::phillips

attach(data)
```

(i) Estimate equation (10.2) using all the data in PHILLIPS.RAW and report the results in the usual form. How many observations do you have now?

Transforming the variables into time series objects

```
inf.ts<-ts(inf, start=1948, frequency = 1)

unem.ts<-ts(unem, start=1948, frequency = 1)
```

Regression estimates

```
lm1<-lm(inf.ts~unem.ts)

summary(lm1)
```

```
##
## Call:
## lm(formula = inf.ts ~ unem.ts)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -5.2176 -1.7812 -0.6659  1.1473  8.8795
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   1.0536     1.5480   0.681   0.4990
## unem.ts       0.5024     0.2656   1.892   0.0639 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 2.972 on 54 degrees of freedom
## Multiple R-squared:  0.06215,    Adjusted R-squared:  0.04479
## F-statistic: 3.579 on 1 and 54 DF,  p-value: 0.06389
```

The estimated equation is expressed as follows

$$\widehat{inf_t} = 1.05 + 0.5 unem_t$$

In total, are 56 observations, covering the period 1948-2003.

(ii) Compare the estimates from part (i) with those in equation (10.14). In particular, does adding the extra years help in obtaining an estimated tradeoff between inflation and unemployment? Explain

No. Even adding extra years, the estimated model is not yet capable of capture the theorical tradeoff between inflation and unemployment rate.

(iii) Now run the regression using only the years 1997 through 2003. How do these estimates differ from those in equation (10.14)? Are the estimates using the most recent seven years precise enough to draw any firm conclusions? Explain.

Selecting the period between 1997-2003

```
inf.ts.2<-ts(inf, start=1997, end=2003, frequency = 1)

unem.ts.2<-ts(unem, start=1997, end=2003, frequency = 1)
```

```
summary(lm2<-lm(inf.ts.2~unem.ts.2))
```

```
##
## Call:
## lm(formula = inf.ts.2 ~ unem.ts.2)
##
## Residuals:
##        1        2        3        4        5        6        7
##  4.67735 -1.60234  0.03471  3.75823 -2.67324 -3.91707 -0.27764
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)    8.888      4.902   1.813    0.130
## unem.ts.2     -1.438      1.113  -1.293    0.253
##
## Residual standard error: 3.497 on 5 degrees of freedom
## Multiple R-squared:  0.2505, Adjusted R-squared:  0.1006
## F-statistic: 1.671 on 1 and 5 DF,  p-value: 0.2526
```

Now, in this case, the expected tradeoff is in fact captured by the model

The estimated equation is expressed as follows

$$\widehat{inf_t} = 8.88 - 1.43 unem_t$$