

Automatical F-test

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手動でF統計量計算するよりも断然楽。

```
load("~/計量経済学演習/R data sets for 5e/mlb1.RData")
mlb1 <- data
```

Unrestricted model

```
res.ur <- lm(log(salary) ~ years+gamesyr+bavg+hrunsyr+rbisyr, data=mlb1)
```

F test

```
library(car)
```

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

```
myH0 <- c("bavg", "hrunsyr", "rbisyr") #batting averageとhome runs per yearとruns batted in per yearのcoef  
が同時に0説  
linearHypothesis(res.ur, myH0)
```

```
## Linear hypothesis test  
##  
## Hypothesis:  
## bavg = 0  
## hrunsyr = 0  
## rbisyr = 0  
##  
## Model 1: restricted model  
## Model 2: log(salary) ~ years + gamesyr + bavg + hrunsyr + rbisyr  
##  
## Res.Df  RSS Df Sum of Sq  F  Pr(>F)  
## 1   350 198.31  
## 2   347 183.19  3   15.125 9.5503 4.474e-06 ***  
## ---  
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

p-valueは4.474e-06で、低いのでH0はrejected。

H0のもっと複雑な組み方

```
myH0 <- c("bavg", "hrunsyr=2*rbisyr") #bavgのcoefは0で、hrunsyrのcoefはrbisyrのcoefの2倍と同じ説  
linearHypothesis(res.ur, myH0)
```

```
## Linear hypothesis test
##
## Hypothesis:
## bavg = 0
## hrunsyr - 2 rbisyr = 0
##
## Model 1: restricted model
## Model 2: log(salary) ~ years + gamesyr + bavg + hrunsyr + rbisyr
##
## Res.Df  RSS Df Sum of Sq   F Pr(>F)
## 1    349 183.73
## 2    347 183.19  2   0.54035 0.5118 0.5999
```

p-valueは0.6ぐらいなのでH0をrejectはできない。

```
myH0 <- matchCoefs(res.ur,"yr") #yrと名のつくもののcoef全部0説
linearHypothesis(res.ur, myH0)
```

```
## Linear hypothesis test
##
## Hypothesis:
## gamesyr = 0
## hrunsyr = 0
## rbisyr = 0
##
## Model 1: restricted model
## Model 2: log(salary) ~ years + gamesyr + bavg + hrunsyr + rbisyr
##
## Res.Df  RSS Df Sum of Sq   F  Pr(>F)
## 1    350 311.67
## 2    347 183.19  3   128.48 81.125 < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

p-value小さいのでH0はreject。全部0なんてことはなさそう。