Chapter 4 - Inference

Thalles Quinaglia Liduares

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Exercise 4.3

Upload packages

```
library(lmreg)
```

```
## Loading required package: MASS
```

```
library(wooldridge)
```

```
##
## Attaching package: 'wooldridge'
```

```
## The following object is masked from 'package:MASS':
##
##     cement
```

Upload database

```
data<-wooldridge::hprice1
```

Refer to Computer Exercise C2 in Chapter 3. Now, use the log of the housing price as the dependent variable:

i. You are interested in estimating and obtaining a confidence interval for the percentage change in price when a 150-square-foot bedroom is added to a house. In decimal form, this is $\theta_1 = 150\beta_1 + \beta_2$. Use the data in HPRICE1.RAW to estimate θ_1.

```
options(scipen=999) # To avoid scientific notation

lm1<-lm(lprice~sqrft+bdrms, data)

summary(lm1)
```

```
##
## Call:
## lm(formula = lprice ~ sqrft + bdrms, data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.75448 -0.12322 -0.01993  0.11938  0.62948
##
## Coefficients:
##               Estimate Std. Error t value             Pr(>|t|)
## (Intercept) 4.76602733 0.09704447  49.112 < 0.0000000000000002 ***
## sqrft       0.00037945 0.00004321   8.781     0.00000000000015 ***
## bdrms       0.02888444 0.02964326   0.974                0.333
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.1971 on 85 degrees of freedom
## Multiple R-squared:  0.5883, Adjusted R-squared:  0.5786
## F-statistic: 60.73 on 2 and 85 DF,  p-value: < 0.00000000000000022
```

Hence, $\theta_1 = 150(0.0003) + 0.0288 = 0.0738$

(ii) Write β_2 in terms of θ_1 and β_1 and plug this into the `log(price)` equation.

Writing β_2 in terms of θ_1 and β_1,

$$\beta_2 = \theta_1 - 150\beta_1$$

Plugging β_2 in the equation:

$$log(price) = \beta_0 + \beta_1 sqrft + (\theta_1 - 150\beta_1)bdrms + u$$

(iii) Use part (ii) to obtain a standard error for $\hat{\theta}_1$ and use this standard error to construct a 95% confidence interval.

In progress…