Chapter 6 -

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Exercise 6.5

Upload packages

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

Upload database

```
data<-wooldridge::hprice1

attach(data)
```

Use the housing price data in HPRICE1.RAW for this exercise.

(i) Estimate the model

$$log(price) = \beta_0 + \beta_1(lotsize) + \beta_2 log(sqrft) + \beta_3 bdrms + u$$

and report the results in the usual OLS format.

```
options(scipen=999) # to avoid sci notation

summary(lm1<-lm(lprice~lotsize+lsqrft+bdrms))
```

```
##
## Call:
## lm(formula = lprice ~ lotsize + lsqrft + bdrms)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.72568 -0.11162 -0.01742  0.12256  0.65949
##
## Coefficients:
##                 Estimate   Std. Error t value             Pr(>|t|)
## (Intercept) -0.427691735  0.672483692  -0.636               0.5265
## lotsize      0.000006052  0.000002089   2.897               0.0048 **
## lsqrft       0.777594512  0.095246879   8.164 0.00000000000285 ***
## bdrms        0.033032344  0.029155343   1.133               0.2604
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.1951 on 84 degrees of freedom
## Multiple R-squared:  0.601,  Adjusted R-squared:  0.5868
## F-statistic: 42.18 on 3 and 84 DF,  p-value: < 0.00000000000000022
```

The estimated equation is expressed as follows

$$log\widehat{(price)} = -0.427 + 0.000006lotsize + 0.777log(sqrft) + 0.03bdrms$$

(ii) Find the predicted value of `log(price)`, when `lotsize` = 20,000, sqrft = 2,500, and `bdrms` = 4. Using the methods in Section 6.4, find the predicted value of price at the same values of the explanatory variables.

$$log\widehat{(price)} = -0.427 + 0.000006(20,000) + 0.777log(2,500) + 0.03(4)$$

$$log\widehat{(price)} = 5.89$$

(iii) For explaining variation in price, decide whether you prefer the model from part (i) or the model

$$price = \beta_0 + \beta_1 lotsize + \beta_2 sqrft + \beta_3 bdrms$$

```
summary(lm2<-lm(price~lotsize+sqrft+bdrms))
```

```
##
## Call:
## lm(formula = price ~ lotsize + sqrft + bdrms)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -120.026 -38.530  -6.555  32.323  209.376
##
## Coefficients:
##               Estimate  Std. Error t value           Pr(>|t|)
## (Intercept) -21.7703081  29.4750419  -0.739            0.46221
## lotsize       0.0020677   0.0006421   3.220            0.00182 **
## sqrft         0.1227782   0.0132374   9.275 0.0000000000000166 ***
## bdrms        13.8525217   9.0101454   1.537            0.12795
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 59.83 on 84 degrees of freedom
## Multiple R-squared:  0.6724, Adjusted R-squared:  0.6607
## F-statistic: 57.46 on 3 and 84 DF,  p-value: < 0.00000000000000022
```

The logarimization of variables permits interpret coefficients of differents measures and sizes in one common scale. In this case, the interpretion of coefficients as percent changes, is more interesting and appropriate.