A-Modern-Approach-to-Regression-with-R–Chapter 2,Exercises 2

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2. A story by James R. Hagerty entitled With Buyers Sidelined, Home Prices Slide published in the Thursday October 25, 2007 edition of the Wall Street Journal contained data on so-called fundamental housing indicators in major real estate markets across the US. The author argues that... prices are generally falling and overdue loan payments are piling up . Thus, we shall consider data presented in the article on Y = Percentage change in average price from July 2006 to July 2007 (based on the S&P/Case-Shiller national housing index); and x = Percentage of mortgage loans 30 days or more overdue in latest quarter (based on data from Equifax and Moody's). The data are available on the book web site in the file indicators.txt.

```
setwd("C:/Users/")
indicators<-read.csv("indicators.csv")
```

Fit the following model to the data:Y=beta0+beta1X+e

```
Y1=indicators$PriceChange
X1=indicators$LoanPaymentsOverdue
Model_in=lm(Y1~X1)
summary(Model_in)
```

```
##
## Call:
## lm(formula = Y1 ~ X1)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -4.6541 -3.3419 -0.6944  2.5288  6.9163
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   4.5145     3.3240   1.358   0.1933
## X1           -2.2485     0.9033  -2.489   0.0242 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 3.954 on 16 degrees of freedom
## Multiple R-squared:  0.2792, Adjusted R-squared:  0.2341
## F-statistic: 6.196 on 1 and 16 DF,  p-value: 0.02419
```

```
#library(ggplot2)
#ggplot(indicators, aes(x = LoanPaymentsOverdue, y = PriceChange)) +
  #geom_point() +
  #stat_smooth(method = "lm", col = "red")
```

a) Find a 95% confidence interval for the slope of the regression model,b1. On the basis of this confidence interval decide whether there is evidence of a significant negative linear association?

Answer:

Since the slope is between a negative confidence interval, there is a significant negative linear association.

```
c=confint(Model_in,level=0.95)
cat("95% confidence interval for the slope:", c[2,])

## 95% confidence interval for the slope: -4.163454 -0.3335853
```

b) Use the fitted regression model to estimate E(Y|X=4). Find a 95% confidence interval for E(Y|X= 4).Is 0% a feasible value for E(Y|X= 4)? Give a reason to support your answer.

Answer:

zero is not a feasible value for E(Y|X= 4) because it is not between -6.648849 and -2.310322.

```
predict(Model_in,data.frame(X1 =4), interval = "confidence")

##         fit       lwr       upr
## 1 -4.479585 -6.648849 -2.310322
```