The correlation r= -0.86 the mean mortgage amount is $121.8 thousand and the mean interest rate is 7.74. the standard deviations are $47.36 thousand for mortgage amounts and 1.79% for interest rates

a) is the regression model appropriate for predicting mortgage amount from interest rates? explain

b) what is the equation that predicts mortgage amount from interest rates

c) what would you predict the mortgage amount would be if the interest rates climbed to 13%

d) do you have any reservations about your prediction in part C

Solution

a) Yes, the regression seems appropriate. Both interest rate and total mortgages are quantitative, and the scatterplot looks pretty straight. The spread is fairly constant, and there are no outliers.

b) We can use the summary data to find the regression equation.

$$b_1 = r\frac{s_y}{s_x} = -0.86\,\frac{47.36}{1.79} = -22.75.$$

$$b_0 = \bar{y} - b_1\bar{x} = 121.8 - (-22.75) \cdot 7.74 = 297.89.$$

The regression equation is:

$$\widehat{Mortgage} = 297.89 - 22.75(Interest\ rate)$$

c) With an interest rate of 13%, we'd predict a mortgage amount of

$$\widehat{Mortgage} = 297.89 - 22.75 \cdot 13 = 2.14\ million.$$

d) Yes, I would have reservations about this prediction. We are extrapolating beyond the range of our data. We cannot be sure the linear relationship still holds.