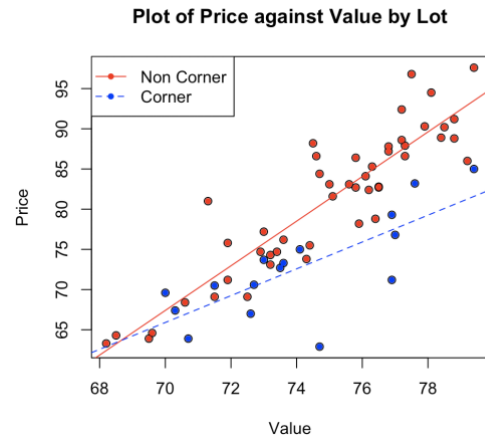


Yunlu Li  
STAT 5120  
Homework 6

1. (a) For both Corner and Non-Corner, there seems to be a positive linear relationship between Price and Value. Since two slopes are not the same, a possible interaction should exist.

$$\begin{aligned} \text{Price (non Corner)} &= -126.9052 + 2.7759 * \text{Value} \\ \text{Price (Corner)} &= -50.8873 + 1.6684 * \text{Value} \end{aligned}$$



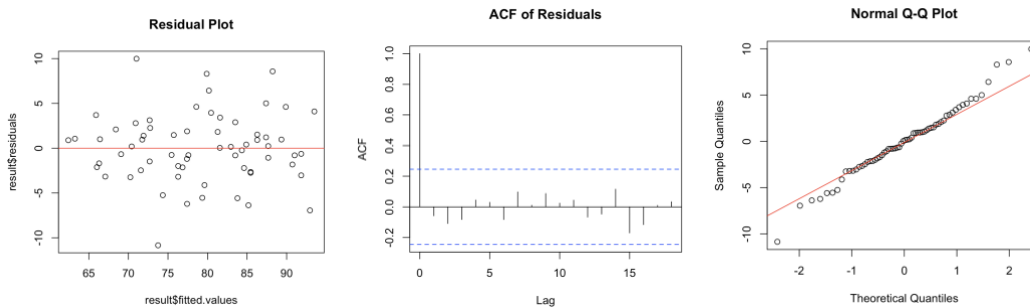
(b)

$$\text{Price} = -126.9052 + 2.7759 * \text{Value} + 76.0215 * \text{Lot} - 1.1075 * \text{Value} * \text{Lot}$$

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )	
(Intercept)	-126.9052	14.7225	-8.620	4.33e-12	***
Value	2.7759	0.1963	14.142	< 2e-16	***
Lot	76.0215	30.1314	2.523	0.01430	*
Value:Lot	-1.1075	0.4055	-2.731	0.00828	**

(c) The residuals fall in a horizontal band around 0, with no apparent pattern. The variance is constant. Errors are uncorrelated, and normality of error term assumption is met.



(d) Test Statistic = 2.6385, p-value = 0.1094. We fail to reject null, so we say that we have equal variances across classes of Lot.

(e) t-statistic is -2.731 and p-value is 0.00828. The interaction term is statistically significant.

(f)

For Corner

$$\begin{aligned} \text{Price} &= -126.9052 + 2.7759 * \text{Value} + 76.0215 * 1 - 1.1075 * \text{Value} * 1 \\ &= -50.8873 + 1.6684 * \text{Value} \end{aligned}$$

For Non-Corner

$$\begin{aligned} \text{Price} &= -126.9052 + 2.7759 * \text{Value} + 76.0215 * 0 - 1.1075 * \text{Value} * 0 \\ &= -126.9052 + 2.7759 * \text{Value} \end{aligned}$$

(g) When assessed value is 70, price of Corner =  $-50.8873 + 1.6684 * 70 = 65.9043$  and price for non-Corner =  $-126.9052 + 2.7759 * 70 = 67.4078$ . The difference is 1.5035.

When assessed value is 80, price of Corner =  $-50.8873 + 1.6684 * 80 = 82.5883$  and price for non-Corner =  $-126.9052 + 2.7759 * 80 = 95.1668$ . The difference is 12.5785.

(h) As the valuation changes, the difference in price of Corner and non-Corner changes. This means the interaction exists.