A Florida real estate appraisal company regularly employs a paired sales technique to evaluate land sales. When two parcels of land are sold, the ratio of the acreage of the larger parcel to the smaller parcel is calculated as well as the difference in sale prices (measured as a percentage of the higher sale price and called a downward adjustment). The variables land sale ratio x (in %) and downward price adjustment y (in Thousands of Dollars) were measured for a random sample of 14 pairs of land sales in Seminole County, Florida as followings:

* Find the Intercept and the Slope for Land Sale Ratio x.

SSxy = 30447.2 – ((554.9 x 567) / 14) = 7973.75

SSxx = 43487.25 - 554.92 / 14 = 21493.3921

b1 = SSxy / SSxx = 7973.75/ 21493.3921 = 0.37098 (slope)

b0 = 567/14 – b1 554.9/14 = 567/14 – (0.37098) 554.9/14 = 25.7957 (intercept)







* Write down the regression equation and interpret it.

D

For every percentage unit increase in the land sale ratio, the downward price adjustment will *Increase* by 0.37098 thousands ($371). When the average land sale ratio is 0%, the downward price adjustment will be 25.7957 thousands dollars.

* Predict the downward price adjustment for the land sale ratio of 50.0, interpret the result.

D

D

The downward price adjustment is $25,981 when the sales ratio is 50%.

* Find the 95% is confidence interval for the Slope. Interpret the result.

df = 14 -1 = 13

*α =*0.05 *α*/2 = 0.025, *t*13, 0.025 = 2.160



0.37098 ± 2.160 \* 0.099692 = [0.15565, 0.5863]

0.156 < b1 < 0.586

The population slope b1 is between 0.156 and 0.586. We are 95% confident that the mean difference in downward price adjustment that differ by 1 land sale ratio is between 0.156 and 0.586.

* State the model and parameters significance using the output.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Parameter Significance | | Model Significance | | |  |
|  | Land Sale Ratio | Y intercept | Model Significance  F-test | P-value | Significant | R-Square |
| Model 1 | 0.00292 | 0.000568 | 13.84821 | 0.00292 | Yes | 0.0769 |

Since the model significance (F) is 0.0092 which is less than 0.05, the model is significant.

Since our y intercept p-value is 0.000568 which is less than 0.05, the y intercept is significant.

Since our slope p-value is 0.00292 which is less than 0.05, the slope is significant.

Final the Correlation and the Coefficient of Determinations and interpret the results. (3 points)

r2 = SSR/SST = 2958.151/ 5521.5 = 0.53575

Our regression model has explained 7.69% of the total variation from the original data.

r = √ r2 = √0.53575 = 0.73195 = 0.732

Our regression model has been explained 53.58% of the total variation from the original data.

