1. The below scatterplots show the mean HPI of each club against clubs’ mean penalties and offense. In comparing the two plots, what do you expect from the model: ?

A graph with a line and a blue line

Description automatically generatedA graph with a line and dots

Description automatically generated

Given that the regression line in the club\_hpi against club\_penalties have a negative slope, I expect the coefficient for club\_penalties to be negative. Since the regression line in the club\_hpi against club\_offense plot has a positive slope, I expect club\_offense to have a positive coefficient.

1. Below is a table of the coefficients of the model:

A close-up of numbers

Description automatically generatedUsing the values provided, interpret and in the context of HPI.

For every additional offensive play, a player’s HPI will increase by 0.017539, provided their total penalties stay constant.

For every additional penalty, a player’s HPI will decrease by 0.071746, provided their total offensive plays remain constant.

1. Using calculations, fill in the rest of the below ANOVA table and perform an ANOVA test to assess the overall fit of .

**H0:**

**Ha:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **d.f.** | **Sum of Squares** | **Mean Square** | **F** | **P-value** |
| **Model** | *k =* **2** | **668.51** | *SSModel/k=*  668.51/2=  **334.26** | *MSModel/MSE*=  334.26/7.42=  **45.05** | **0.00** |
| **Residual** | *n-k-1=*  309-2-1= **306** | **2270.72** | *SSE/(n-k-1)=*  2270.72/306=  **7.42** |
| **Total** | *n-1 =* 309-1 **= 308** | *SSModel + SSError =* 668.51 + 2270.72 = **2939.23** |

**Conclusion:**

p-value < 0.05

Reject H0

We have significant evidence that at least total\_offense or total\_penalties are effective predictors of HPI in handball.

1. The below scatterplot shows total\_penalties against total\_offense with a regression line. Based on this plot what do you expect the correlation between total\_penalties and total\_offense to be?

A graph with a line and a line

Description automatically generated

Given that the regression line shows total\_penalties increasing with total\_offense, I expect them to have a strong positive correlation

1. Using a correlation of 0.7341583, test the significance of the correlation between the total\_offense and the total\_penalties of a player. Provide an interpretation of the results.

**H0: Ha:**

Compare on t distribution 307 df.

P-value= **0**

**Conclusion:**p-value < 0.05

Reject H0

We have significant evidence of a strong positive correlation between total\_penalties and total\_offense, meaning they increase together.

1. Could it be concluded that having more penalties increases the skill and success of a player in the form of HPI?

Having more penalties in some ways decreases a players success as they can detract from the playing time of a player. However, it seems that being a more aggressive player or a player with more penalties, tends to leads towards players being more offensively aggressive as well which does improve their success.