Chart, scatter chart

Description automatically generated

The overall relationship is curvilinear.

Fitting a linear regression.

Chart, scatter chart

Description automatically generated

It appears that there is a curvature, and you see that's this curvature is in the residuals. This indicates that the model does not make sense.

**Fitting a quadratic model**

Chart

Description automatically generated

Residual by predicted plot

Chart, scatter chart

Description automatically generated

Actual by Predicted plot

Chart, scatter chart

Description automatically generated

Residual by X plot

Chart, scatter chart

Description automatically generated

Residual Nornal Quantile Plot

Chart, histogram

Description automatically generated

Residual by Row Plot

Chart

Description automatically generated

The quadratic model does a better job of explaining the relationship between the two variables. The residuals for the quadratic model do not show a curvature, in the squared terms in the quadratic model is significant. RMSE is much lower for the quadratic model in the R square and adjusted Rsquare are higher.

**Fitting cubic model.**

Chart, scatter chart

Description automatically generated

The R square an adjusted R square statistic for the cubic model are higher, the cubic model has the lowest RMSE, and the CU team in the parameter estimates table is significant. Therefore, the cubic model is best at describing the relationship.