Coefficients

The new formula after running the stepwise function on the logistic model is as follows:

Competitive = a + b1*Category + b2*Currency + b3 *SellerRating + b4*EndDay + b5*OpenPrice

And the resulting coefficients are as follows:

```
Coefficients:
                             Estimate Std. Error z value Pr(>|z|)
(Intercept)                 3.047e-01  2.860e-01   1.065 0.286660
CategoryAutomotive         -5.905e-01  3.076e-01  -1.919 0.054937 .
CategoryBooks              -4.229e-01  4.339e-01  -0.975 0.329664
CategoryBusiness/Industrial 1.520e+00  8.332e-01   1.825 0.068059 .
CategoryClothing/Accessories 3.108e-01 3.622e-01   0.858 0.390862
CategoryCoins/Stamps       -1.285e+00  5.496e-01  -2.338 0.019362 *
CategoryCollectibles        3.397e-01  2.738e-01   1.241 0.214646
CategoryComputer            1.044e+00  5.897e-01   1.771 0.076553 .
CategoryElectronics         1.491e+00  6.093e-01   2.447 0.014417 *
CategoryEverythingElse     -2.068e+00  6.954e-01  -2.975 0.002934 **
CategoryHealth/Beauty      -2.815e+00  6.450e-01  -4.365 1.27e-05 ***
CategoryHome/Garden         6.931e-01  3.730e-01   1.858 0.063167 .
CategoryJewelry            -5.138e-01  3.674e-01  -1.399 0.161910
CategoryMusic/Movie/Game    2.503e-02  2.552e-01   0.098 0.921856
CategoryPhotography         9.874e-01  8.435e-01   1.171 0.241788
CategoryPottery/Glass      -1.997e-01  6.141e-01  -0.325 0.745107
CategorySportingGoods       1.326e+00  3.727e-01   3.558 0.000373 ***
CategoryToys/Hobbies        3.601e-01  2.769e-01   1.300 0.193556
CurrencyGBP                 1.661e+00  4.794e-01   3.465 0.000530 ***
CurrencyUS                  1.183e-01  1.901e-01   0.622 0.533864
SellerRating               -5.362e-05  1.332e-05  -4.025 5.69e-05 ***
EndDayMon                   7.310e-01  2.212e-01   3.305 0.000949 ***
EndDaySat                  -6.766e-01  2.346e-01  -2.884 0.003926 **
EndDaySun                  -3.637e-01  2.349e-01  -1.548 0.121574
EndDayThu                  -1.155e+00  4.545e-01  -2.541 0.011038 *
EndDayTue                  -2.053e-01  2.736e-01  -0.750 0.452985
EndDayWed                  -8.981e-01  3.874e-01  -2.318 0.020447 *
OpenPrice                  -5.183e-03  2.630e-03  -1.971 0.048727 *
---
```

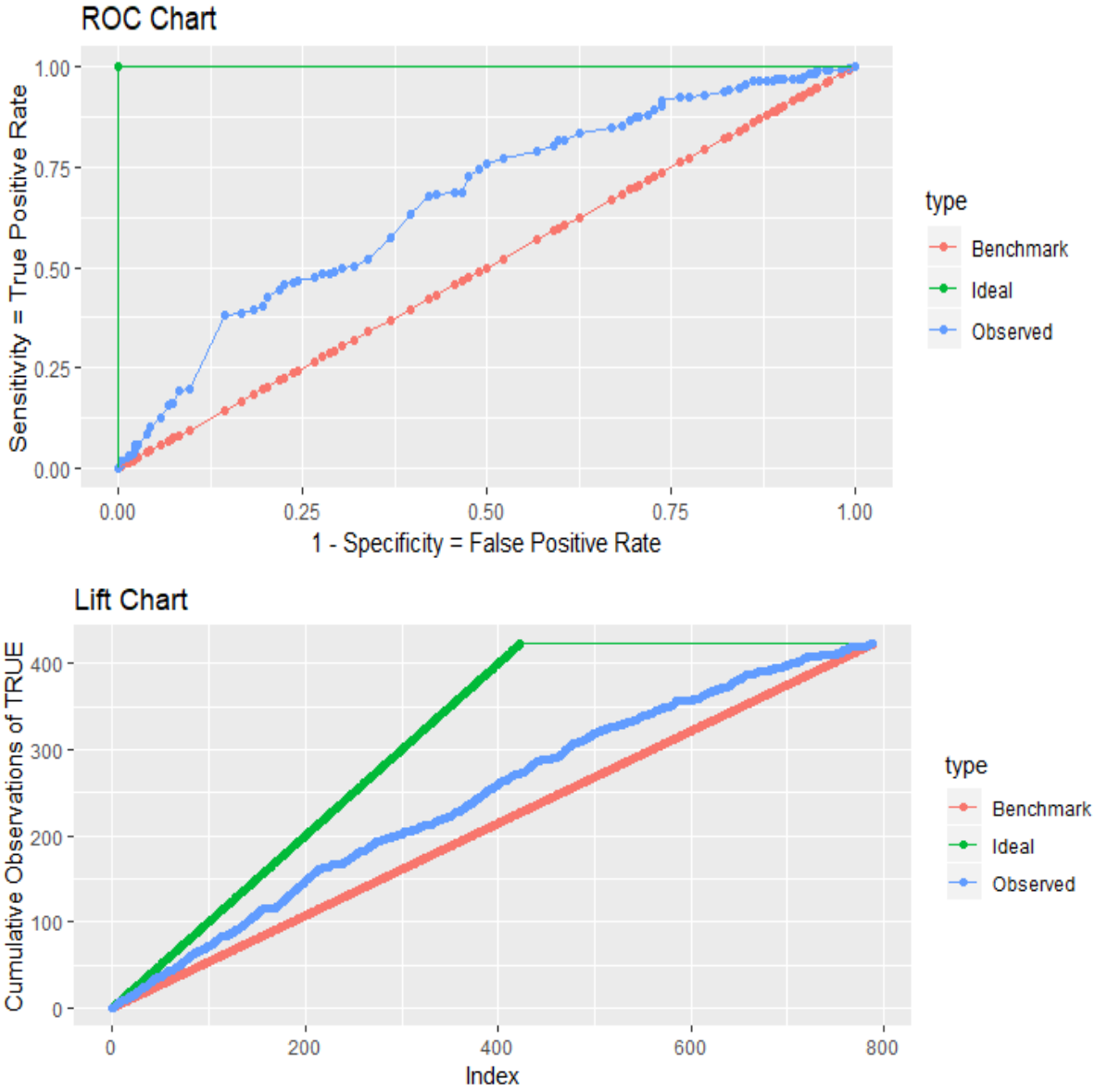
Duration had a coefficient of -3.427e-02 which means that the longer the duration of auctioning an item, the less competitive that item is. Duration has a high p-value and hence was removed from the model after applying the stepwise function because it is insignificant. Items sold in US currency seems to be more competitive than those sold in EUR currency. Items sold in GBP currency are more competitive than items sold in USD and EUR.

Error Comparison

Error of logistic regression model before stepwise function = 36.5%
Error of logistic regression model after stepwise function = 36.37%
Benchmark error rate = 46.38%

Logistic regression does have a better error rate than the benchmark error. Its error rate gets smaller (although not as significantly as expected) after running stepwise function to remove insignificant variables. An error rate of 36.37% isn't good enough (I wouldn't put my money on the table for 36.37%) and we may have to use other machine learning models to get a better performance or build strategies to mitigate the consequences of poor performance.

Lift Chart



Both the ROC and the Lift chart show that our model's error rate is pretty close to the benchmark error rate than the ideal performance (of 0 false positive and all true positives). This just confirms what we have in numbers (observed error 36.4% is far from ideal and is close to benchmark 46.4%)