Indicative Votes (Predictors)

First Round

1. Customs Union

2. Second Referendum

3. Labour's Plan

4. EFTA/EEA (Switzerland)

5. Revoke Article 50

6. No Deal

7. Preferential agreements with the EU

8. EEA/EFTA but without a customs union

Second Round

1. Customs Union

2. Second Referendum

3. EEA/EFTA (Switzerland)

4. Extend Article 50, Parliament to take over from the Government.

Data Preparation

- Scraped from the Guardian website using a Python script
- Added the second set of votes
- Used the proper *model predictions* for brexit votes (Hanretty estimates)

- Removed John Bercow (The Speaker) as he has no party allegiance and does not cast votes
- Kept all parties, and also created a Con/Lab/Other column.
- "Abstain" was kept as a legitimate voting decision.

Response variables
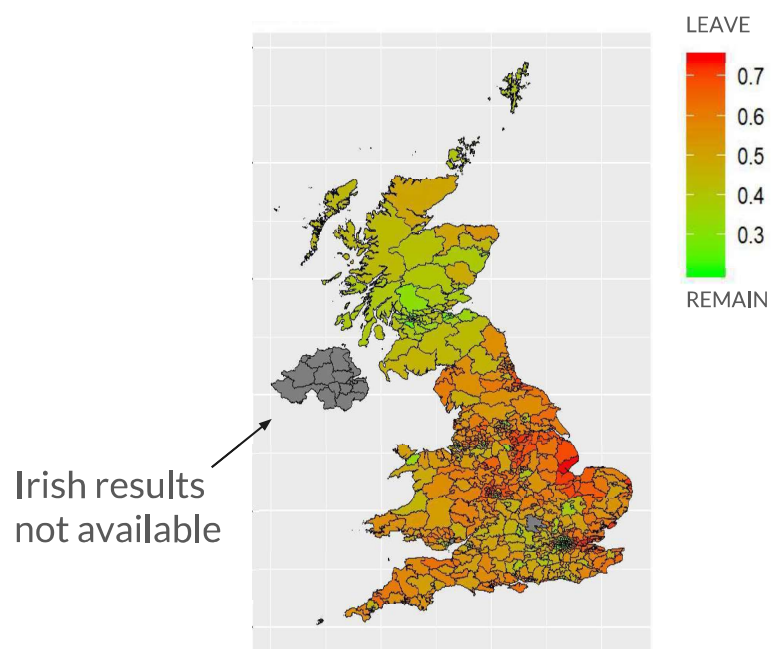
Party

1. All parties
2. Conservative/Labour/Other

Constituency

1. Percentages *(Regression)*
2. Remain/Leave
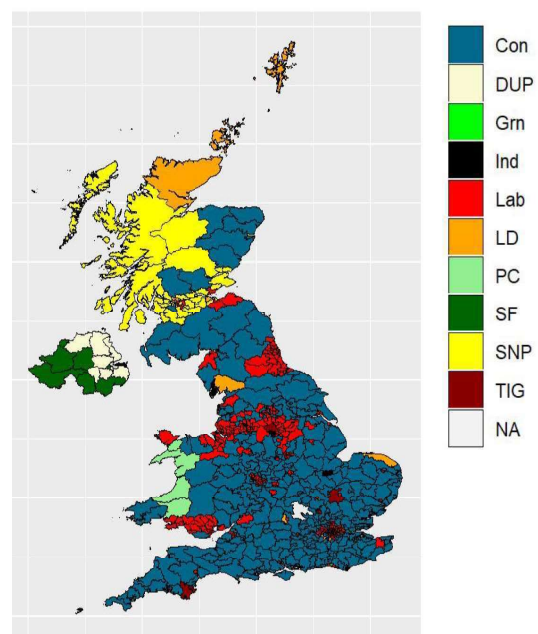3. Remain/Leave/Strong Leave (58.3% and above)
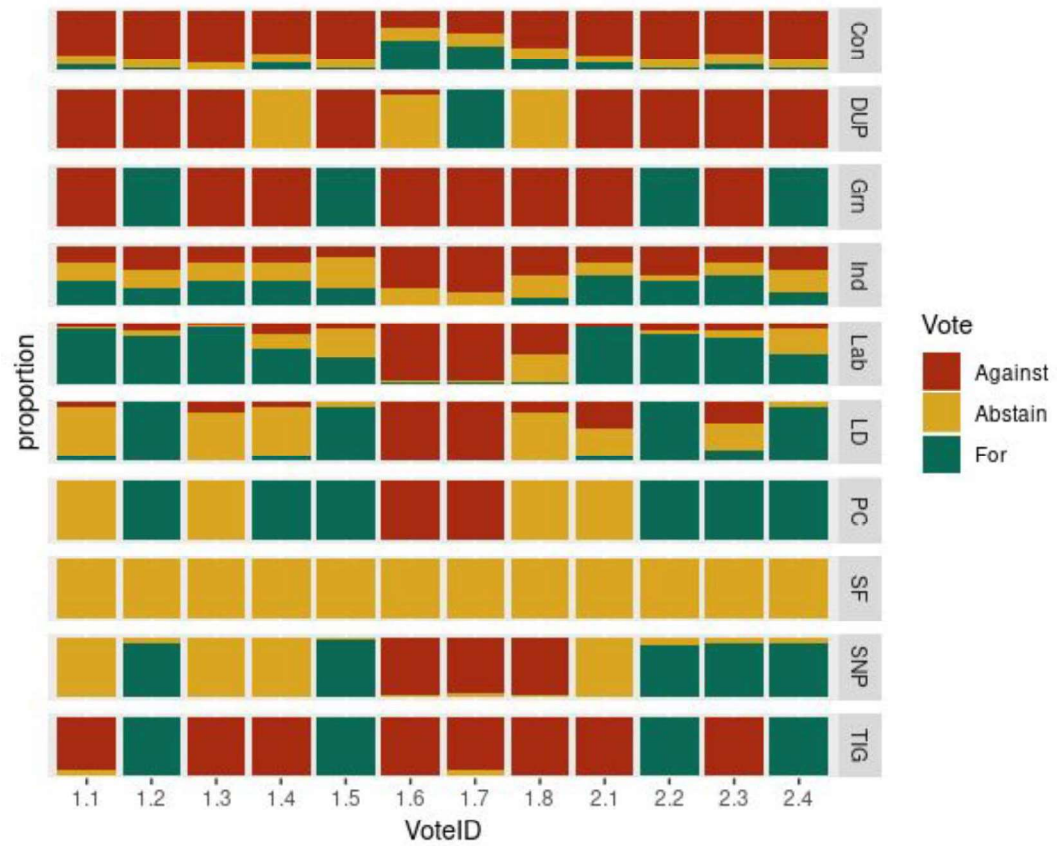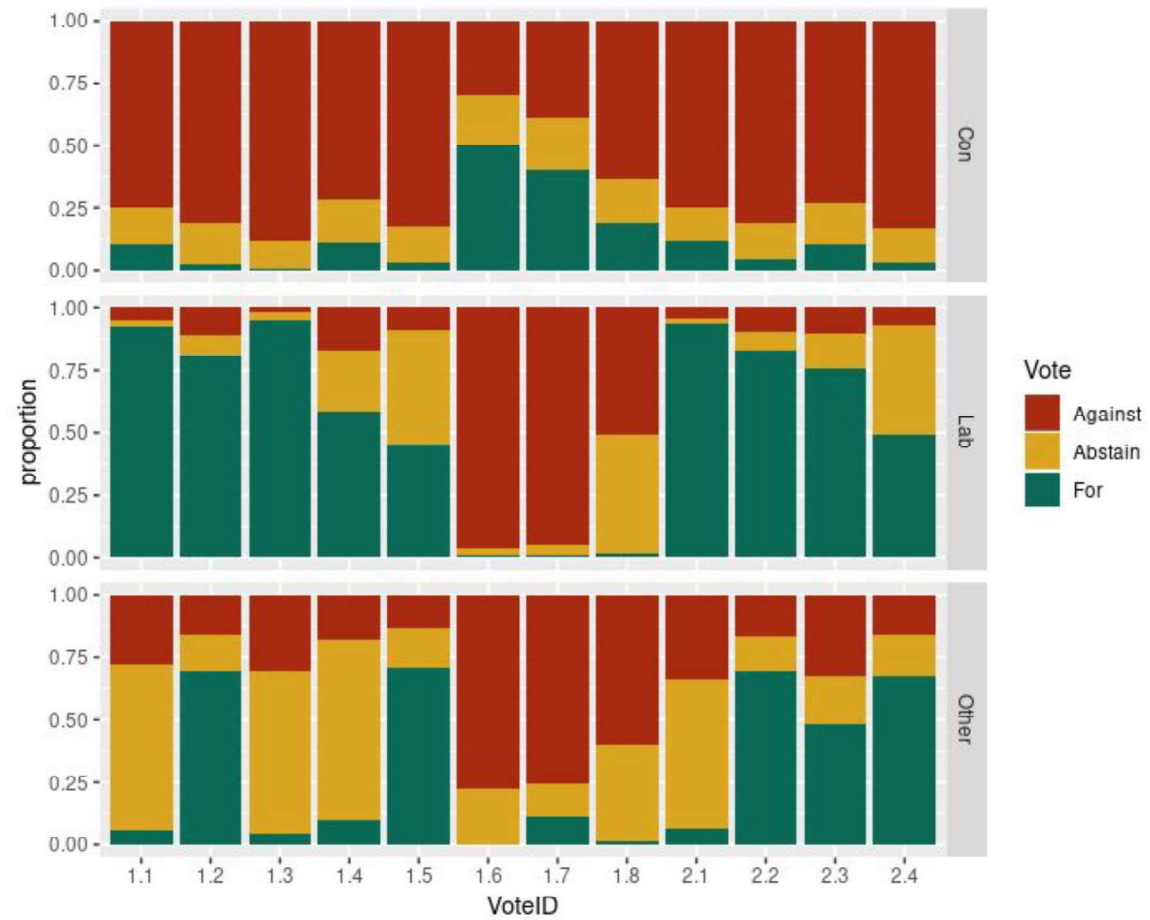4. Quantiles

Perspective

Brexit Referendum

LEAVE

0.7
0.6
0.5
0.4
0.3

REMAIN

Irish results
not available

Constituencies

Con
DUP
Grn
Ind
Lab
LD
PC
SF
SNP
TIG
NA

The Votes

Distribution of party votes across
the different votes.

Major parties versus the rest...

Modelling

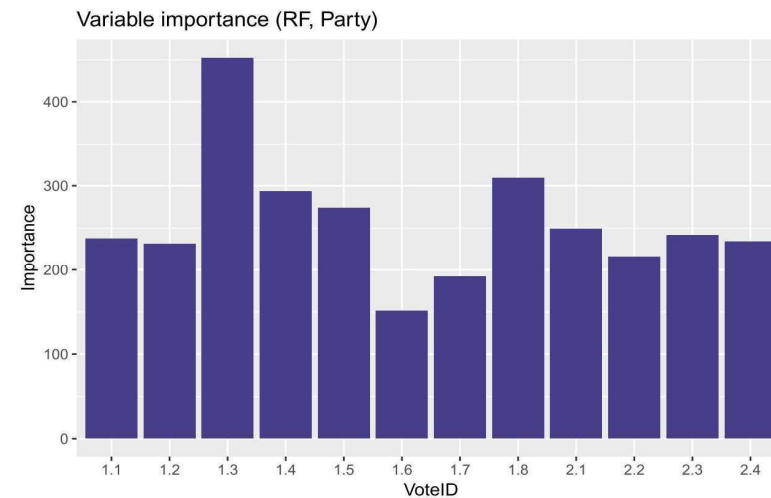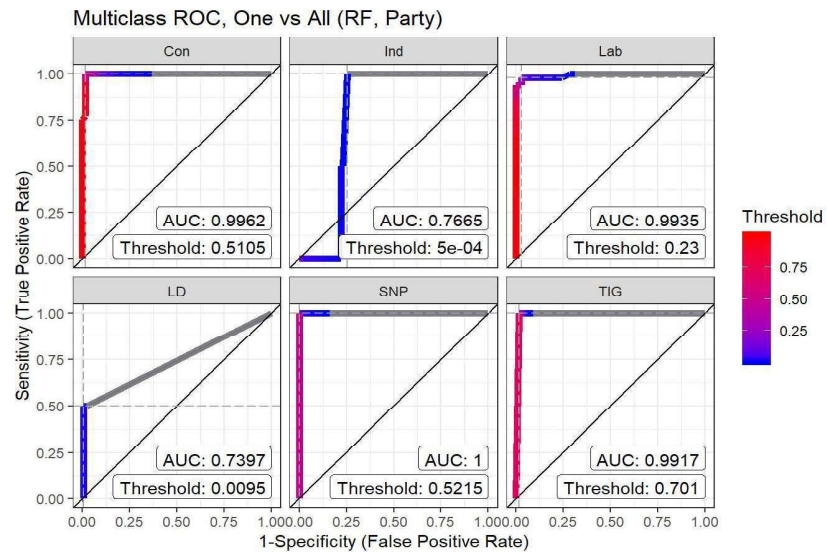| Model	R Package
Neural Net	nnet
Support Vector Machine (SVM)	kernlab
Generalized linear models (GLM)	MASS, nnet
Naïve Bayes	e1071
Decision Tree	rpart
Random Forest	randomForest
Boosting	gbm, adaBoost, xgboost

+ *caret*

Accuracies - Classification models
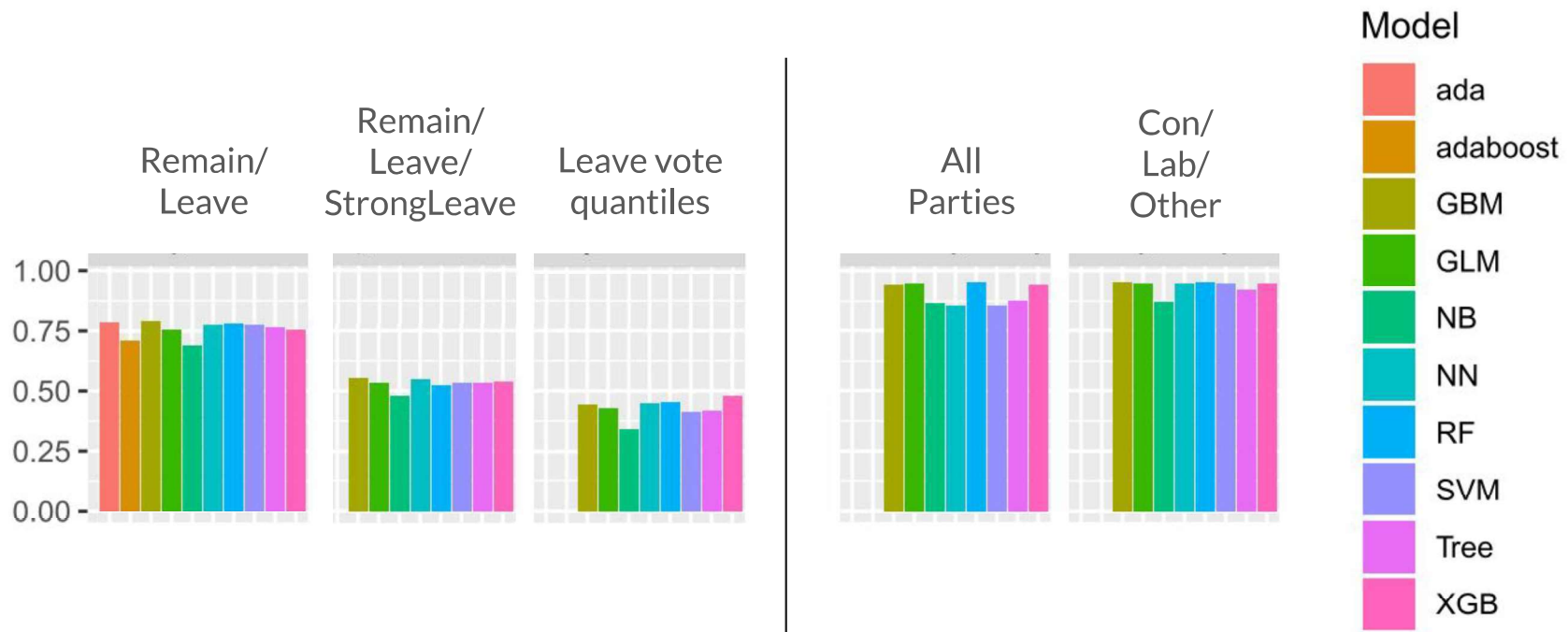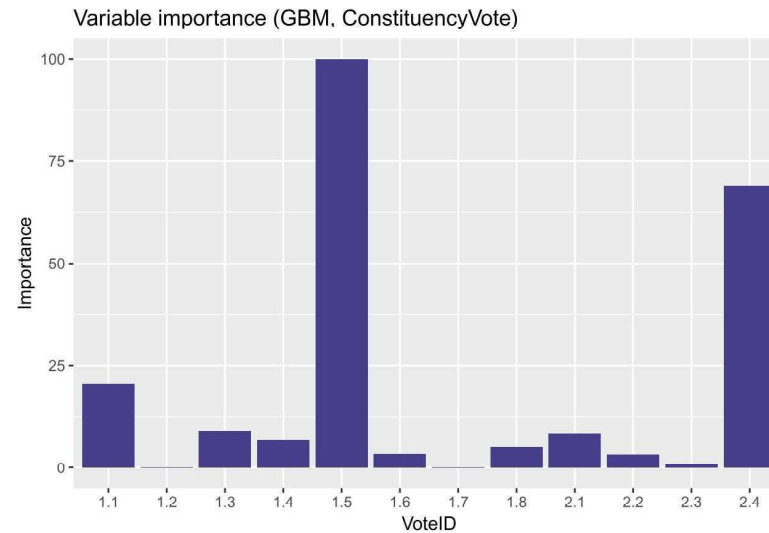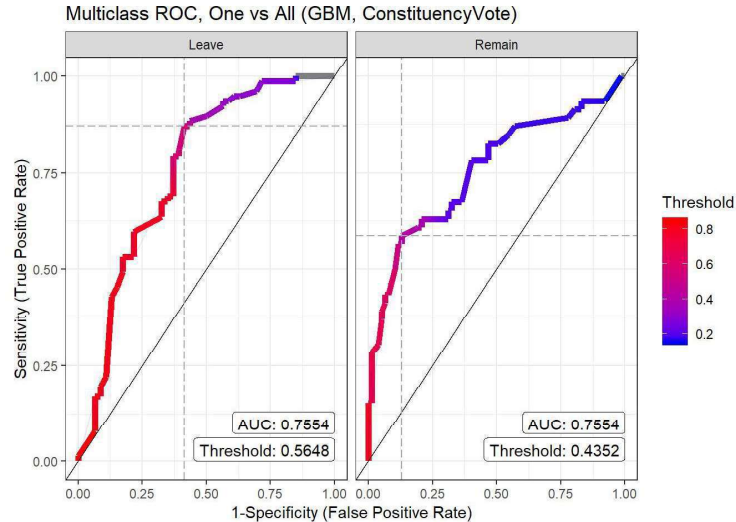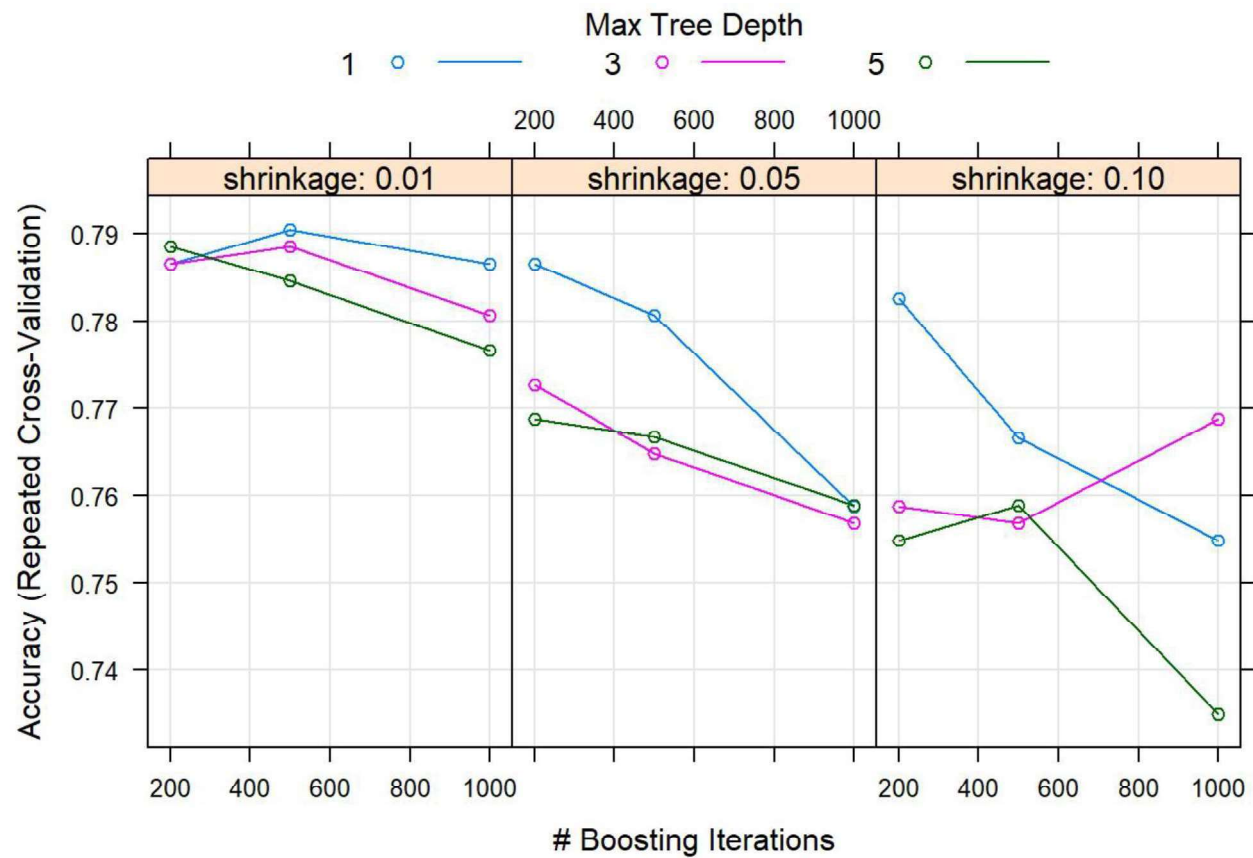
Response: **Party**

Best model: **Random Forest**

Response: Remain/Leave

Best Model: Boosted Trees

Multiclass ROC, One vs All (GBM, ConstituencyVote)
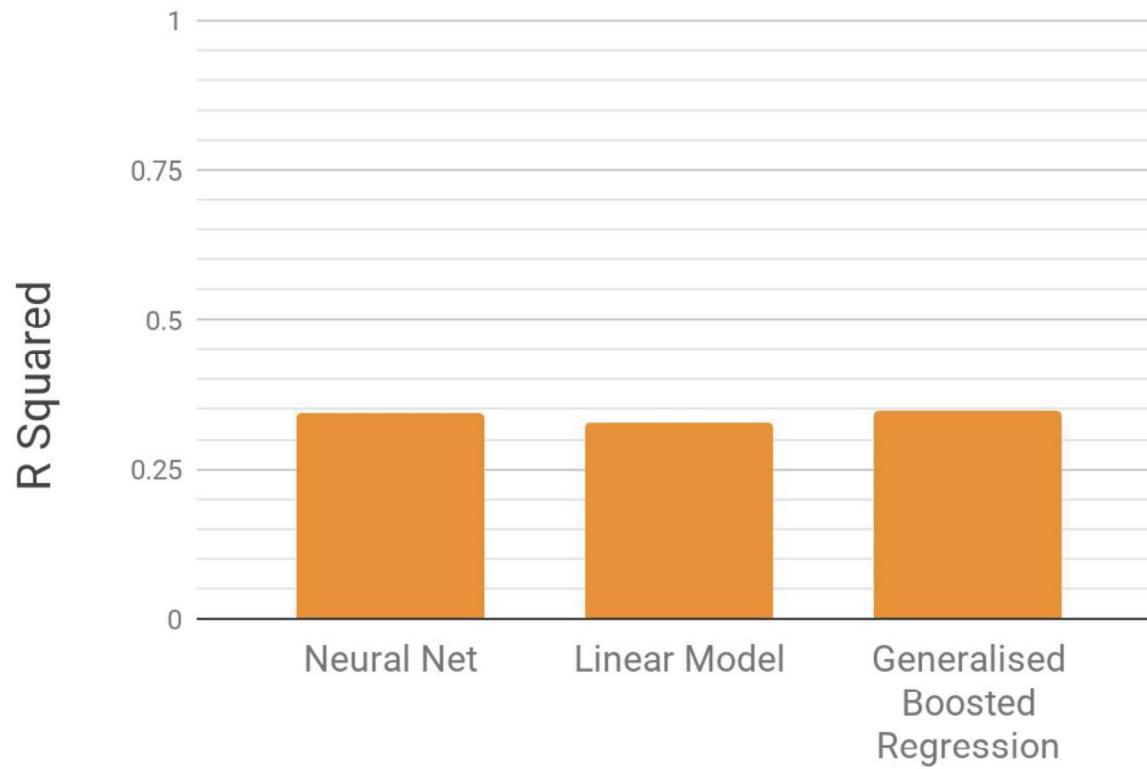

Variable importance (GBM, ConstituencyVote)
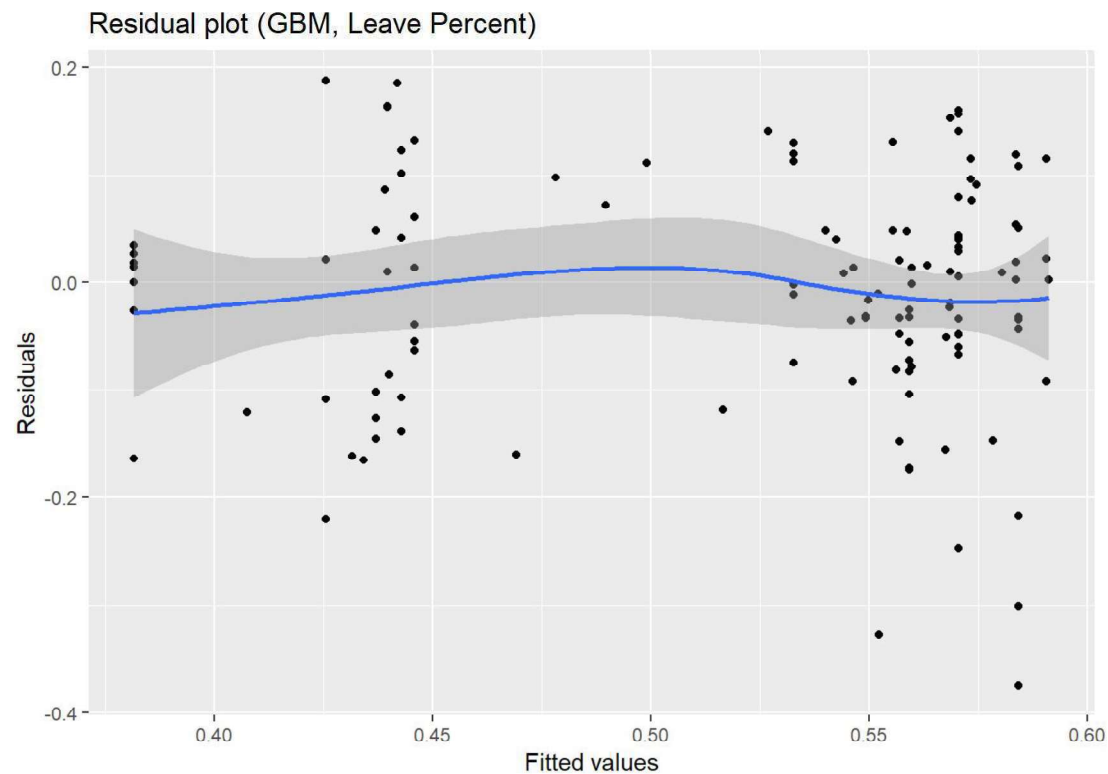
Boosting Parameters

Accuracies - Regression models (Leave %)

Response: **Leave %**

Best model: **Generalised Boosting Regression**

Conclusions

Party vs Referendum

We are able to more accurately predict an MP's **party** than their **constituency's 2016 referendum result**. This suggests that party unity is stronger than loyalty to constituents.

Variable importance

Using this process, we can expose which votes are more important when predicting different outcomes

Party :

- Vote 3 (Labour's plan)
- Vote 8 (EEA/Efta without customs union)

Referendum Result:

- Vote 5 (Revoke Article 50)
- Round 2, Vote 4 (Extend Article 50)

Variable importance (RF, Party)

Variable importance (GBM, ConstituencyVote)