

DOES MONEY BUY SUCCESS?

TEAMS' VALUE AND MATCH OUTCOMES IN THE BUNDESLIGA

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OUTCOME VARIABLE

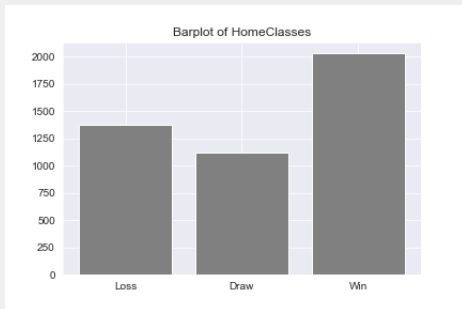


Figure: Histogram of Match Outcomes

- Match Outcomes from the Home team perspective
- Unconditional probabilities indicate that Home team has a higher likelihood of winning

TREATMENT VARIABLE | 1

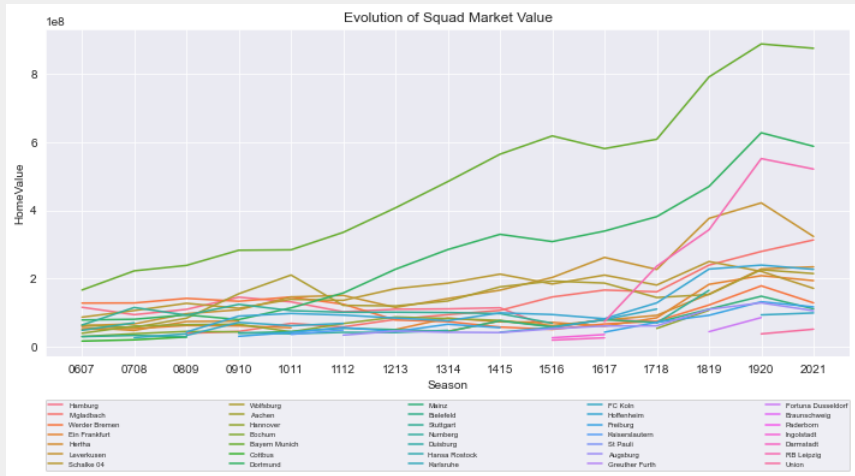


Figure: Histogram of Match Outcomes

HomeClasses	HomeHigherVal	Obs
Loss	0.334	1378
Draw	0.491	1117
Win	0.62	2032

Table: Mean of treatment for match outcome

- ▶ Creating a dummy variable, indicating if Home team is more expensive
- ▶ Indicate a positive trend between higher market value and likelihood of winning

Macro Variables

- ▶ Diff in GDP, unemployment and TV revenue.

Seasonal Dummies

- ▶ Dummy variables to control for each season, 06/07 - 19/20, with 20/21 being the base dummy.

Team Stats

- ▶ Age, Height, Champions, Relegated

Match Stats

- ▶ Shots on target, fouls, yellow/red cards, corners
- ▶ Attendance

In total, 43 covariates, including the treatment variable.

Ordinal Logistic Regression

- ▶ Parametric estimator
- ▶ Latent linear model
- ▶ Assume logistic distribution
- ▶ Min. maximum margin loss function
 - ▶ Gradient descent
 - ▶ SciPy optimizer

Ordered Random Forest

- ▶ Non-parametric estimator
- ▶ Based on binary forest regression
- ▶ No distributional assumption required
- ▶ Min. mean squared error

Two different models...

- ▶ Parametric vs. non-parametric estimator
- ▶ Distributional assumption

Conclusion

Model specification is correct and distributional assumption holds

⇒ logit model may be the more efficient estimator

RESULTS

- ▶ Mean marginal effects are chosen in the design
- ▶ Both models are credible.
- ▶ A more valuable home team should expect 0.212 or 0.165 more points

	OLogit	ORF
0 point	-0.063	-0.061
1 point	-0.011	0.09
3 points	0.074	0.052

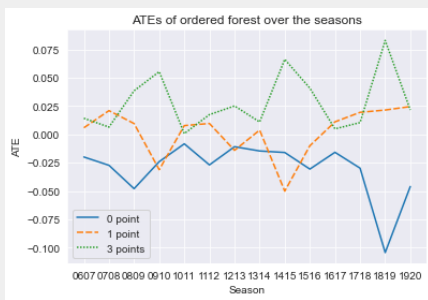
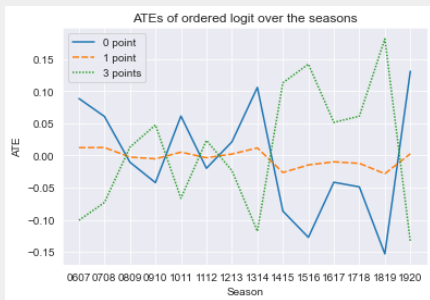
Table: ATE of higher home value

	OLogit	ORF
Extra points	0.212	0.165

Table: Extra points

ROBUSTNESS CHECK

Test 1: Evolution of ATEs over the seasons



Test 2: Removal of outliers (Bayern Munich and Dortmund)

- The marginal effects drop. A more expensive home team should expect between 0.16 and 0.11.

PREDICTION PERFORMANCE

	MSE^1	CA
OLogit	1.025	0.487
ORF	0.586	0.527

Table: Prediction performance for both estimators.

- ▶ ORF performs better in terms of MSE and CA
- ▶ Logit model has troubles estimating class 1 (draw)

$$^1MSE = \frac{1}{N} \sum_{i=0}^N \sum_{j=1}^J (I(Y_i = j) - \hat{P}[Y_i = j | X_i = x])^2$$

Identifying Assumptions:

- ▶ Conditional independence
 - ▶ Control for the most important confounders
 - ▶ In line with current literature
- ▶ Common support
 - ▶ Given by the structure of the data
- ▶ Exogeneity of confounders
 - ▶ Market value could influence match related variables
- ▶ Stable unit treatment value assumption

SUMMARY

- ▶ Overview of the data
- ▶ Estimation with Ordered Logit Regression and Ordered Random Forest
- ▶ Result: A more valuable home team can expect 0.212 (Ordered Logit) or 0.165 (ORF) more points.
- ▶ Causal effect may be biased towards zero because exogeneity assumption may not hold.