Part 3 - EvaluateModel

September 2, 2020

0.0.1 Intro

This notebook evaluates the base Brownian Motion Win Probability model by using seasons 2011-2016 as the training set and testing using seasons 2017 and 2018. Since the output of the model is a probability, the validation is being done using reliability diagrams.

[1]:
```
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np
import scipy.stats as stats

from nba_win_probability import dataloader, transformations, plotting,␣
 ↪win_probability
```

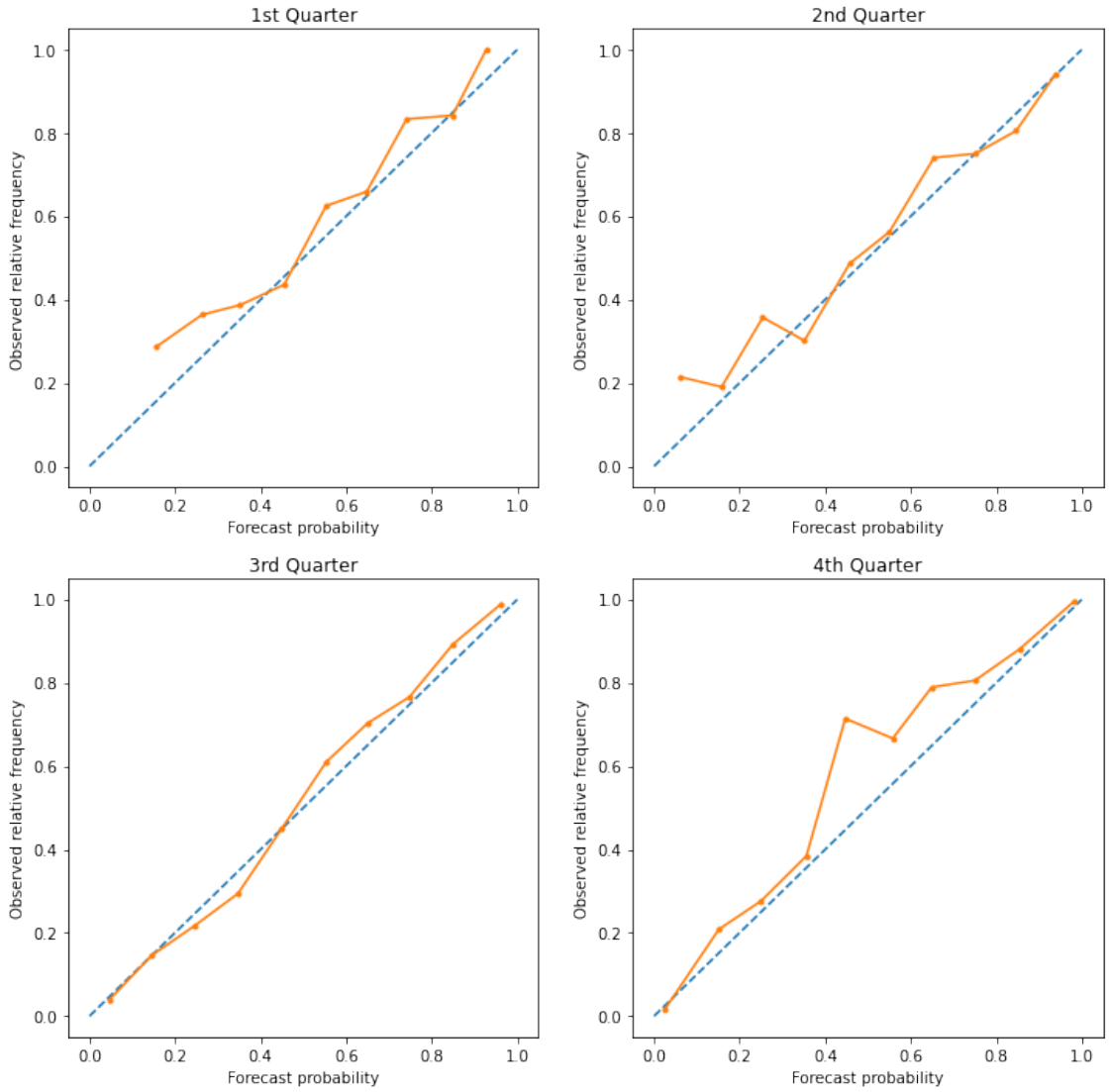
[2]:
```
training_seasons = ["2011", "2012", "2013", "2014", "2015", "2016"]
training = dataloader.load_multiple_seasons(training_seasons)
training = transformations.transform_data_for_analysis(training)
training = training[['GAME_ID', 'PLAYER1_TEAM_ABBREVIATION',␣
 ↪'PLAYER2_TEAM_ABBREVIATION', 'PCTIMESTRING', 'PERIOD', 'SCORE',␣
 ↪'SCOREMARGIN', 'SEASON', 'QUARTER_TS', 'TIME_ELAPSED', 'MINUTE',␣
 ↪'SCORE_BY_MINUTE']]

testing = dataloader.load_multiple_seasons(["2017", "2018"])
testing = transformations.transform_data_for_analysis(testing)
testing = testing[['GAME_ID', 'PLAYER1_TEAM_ABBREVIATION',␣
 ↪'PLAYER2_TEAM_ABBREVIATION', 'PCTIMESTRING', 'PERIOD', 'SCORE',␣
 ↪'SCOREMARGIN', 'SEASON', 'QUARTER_TS', 'TIME_ELAPSED', 'MINUTE',␣
 ↪'SCORE_BY_MINUTE']]
```

[3]:
```
scores_by_minute = training['SCORE_BY_MINUTE']
bwp = win_probability.BrownianWinProbabilitySimulation(scores_by_minute,␣
 ↪seed=808)
```

[4]:
```
# Estimate the win probability and add the actual game result for each row of␣
 ↪the testing set
testing_set = transformations.add_game_result_column(testing)
testing_set = testing_set[testing_set['RESULT'] != 'undefined']
testing_set = transformations.get_moment_from_each_game(testing_set)
```

```
testing_set = transformations.assign_win_probabilities(testing_set, bwp)
testing_set = testing_set.astype({'RESULT': int})
```

[5]:
```
plotting.plot_reliability_diagram_by_quarter(testing_set)
```



0.0.2 Conclusion

The reliability diagrams look like they match the observed data very well. The 3rd quarter in particular is spot-on, but I am not quite sure what is happening in the 4th quarter. All-in-all, this brownian simulation approach looks to be fairly effective.

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