

BTM301 Class Project

Effects of Performance and Non-performance Factors on AAV of Free Agent contracts in Baseball

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December 10, 2024

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Introduction

Background

- Free agent contracts in baseball are determined by various factors
- Performance and non-performance factors are considered
- Performance factors include statistics like ERA, OBP, etc.
- Non-performance factors include team attendance, salary cap usage, etc.

Model

Hitter Model

$$\log AAV_i = \beta_{WR} \log WR_i + \beta_{Atd} \log Atd_i + \beta_{SU} \log SU_i + \beta_L \log (1 + L_i) + \beta_{AGE} \log AGE_i + \beta_{OBP} \log OBP_i + \beta_{SLG} \log SLG_i + \beta_{HR} \log HR_i + \beta_{PA} \log PA_i + \beta_0 + \varepsilon_i \quad (1)$$

where:

- AAV_i : AAV of free agent contract, normalized by CPI at the year of signing
- WR_i : Win rate of the player's last team before free agency
- Atd_i : Average attendance at home game of team the player signed with
- SU_i : Last season's salary cap usage of team the player signed with
- L_i : Dummy variable indicating left-handedness of the player
- AGE_i : Age of the player at the time of signing
- OBP_i : On-base percentage of the player, divided by league average
- SLG_i : Slugging percentage of the player, divided by league average
- HR_i : Home runs of the player
- PA_i : Plate appearances of the player

Pitcher Model

$$\log AAV_i = \beta_{WR} \log WR_i + \beta_{Atd} \log Atd_i + \beta_{SU} \log SU_i + \beta_L \log (1 + L_i) + \beta_{AGE} \log AGE_i + \beta_{ERA} \log ERA_i + \beta_{WHIP} \log WHIP_i + \beta_{SO} \log SO_i + \beta_{IP} \log IP_i + \beta_0 + \varepsilon_i \quad (2)$$

where:

- AAV_i : AAV of free agent contract, normalized by CPI at the year of signing
- WR_i : Win rate of the player's last team before free agency
- Atd_i : Average attendance at home game of team the player signed with
- SU_i : Last season's salary cap usage of team the player signed with
- L_i : Dummy variable indicating left-handedness of the player
- AGE_i : Age of the player at the time of signing
- ERA_i : Earned run average of the player, divided by league average
- $WHIP_i$: Walks plus hits per inning pitched of the player, divided by league average
- SO_i : Strikeouts of the player
- IP_i : Innings pitched of the player

Data Collection

- 2010-2019 free agent contracts from MLB and KBO were collected
- Performance data was collected from Baseball Reference and KBO's official website
- Attendance data was collected from ESPN and KBO's official website
- Salary cap usage data was collected from independent researcher's website

Results

Discussion

Conclusion