

WINNING OVER THE FANS

THE IMPACT OF TEAM PERFORMANCE ON MLB ATTENDANCE

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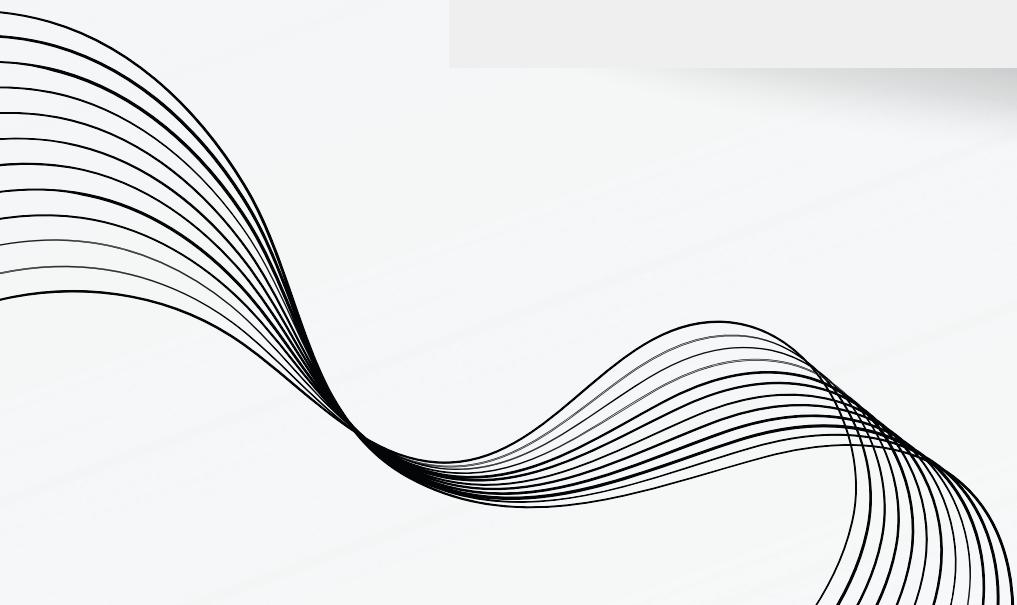
OBJECTIVE & QUESTION



Examine how an MLB team's on-field performance impacts their attendance over time



Should MLB be incentivized to pursue winning in order to increase attendance and increase profitability?



DATA

MLB Standings



- Scrapped from BaseballReference.com
- Date range: 1903–2024
- Contains historical records on team names and various Win/Loss numbers
 - Wins and losses
 - Average runs given up and scored
 - Strength of schedule

- Scrapped from BaseballReference.com
- Date range: 1903–2024
- Contains historical records on team names and attendance
 - Attendance and attendance per game
 - Average pitcher and batter age
 - Number of Hall of Famers

MLB Attendance



Note: Due to the COVID Pandemic, the 2020 season was not played. Average Wins and Attendance were imputed for this year.

TEAM SELECTION



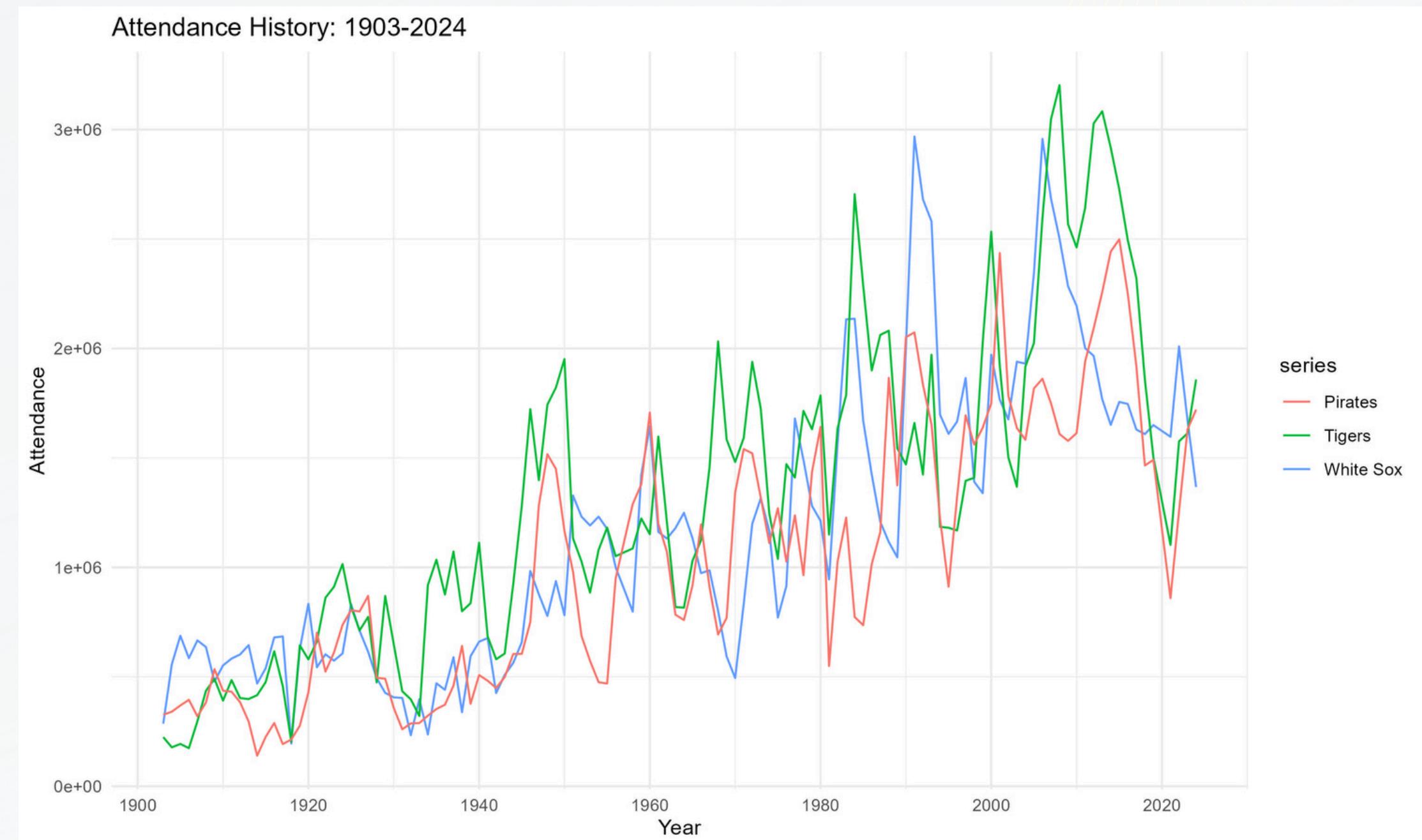
Random Walk Testing

	Random Walk Testing		
T-Statistic	-2.637	-2.708	-2.940
P-Value	0.008	0.007	0.003

MODEL TRIALS

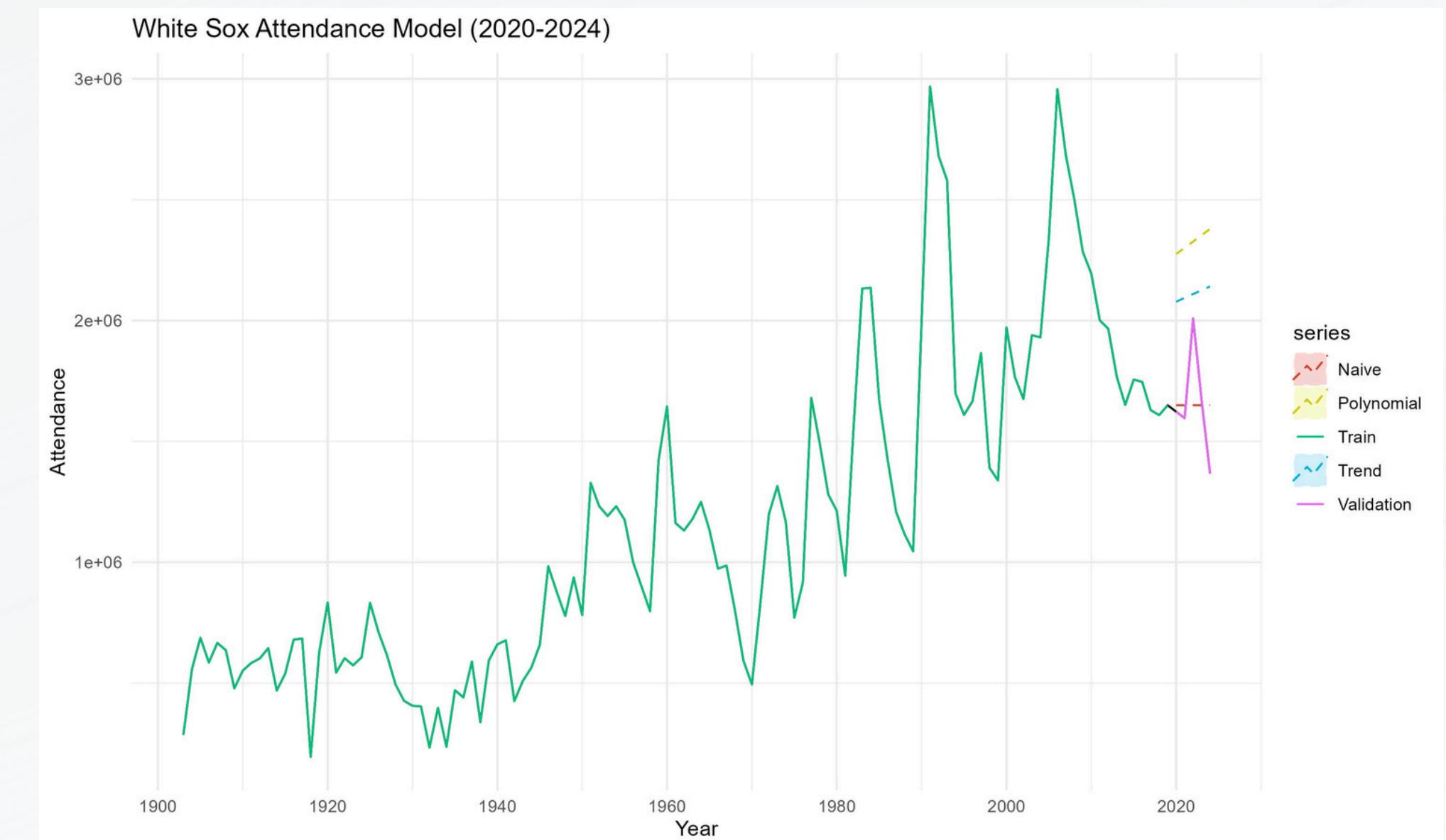
Methods Used:

- Naive
- Linear with Trend
- Polynomial with Trend
- Moving Average
- Holt Model
- Auto ARIMA
- SARIMAX
- SARIMAX with lagged predictors



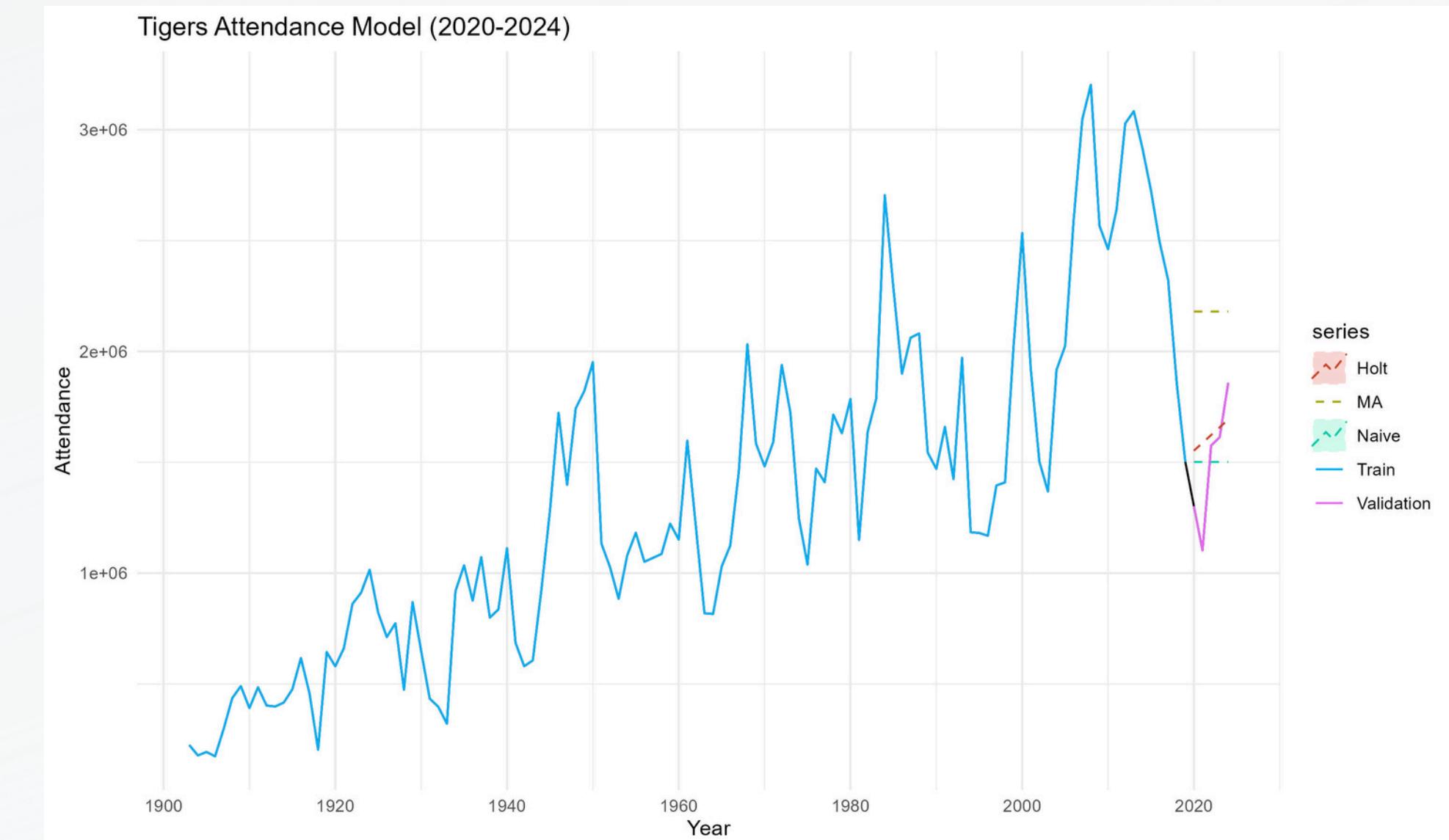
NAIVE AND TREND

Test Error (MAPE)			
	White Sox	Tigers	Pirates
Naive	8.953	16.460	28.171
Linear (Trend)	29.631	69.957	57.165
Polynomial (Trend)	43.029	75.267	69.805



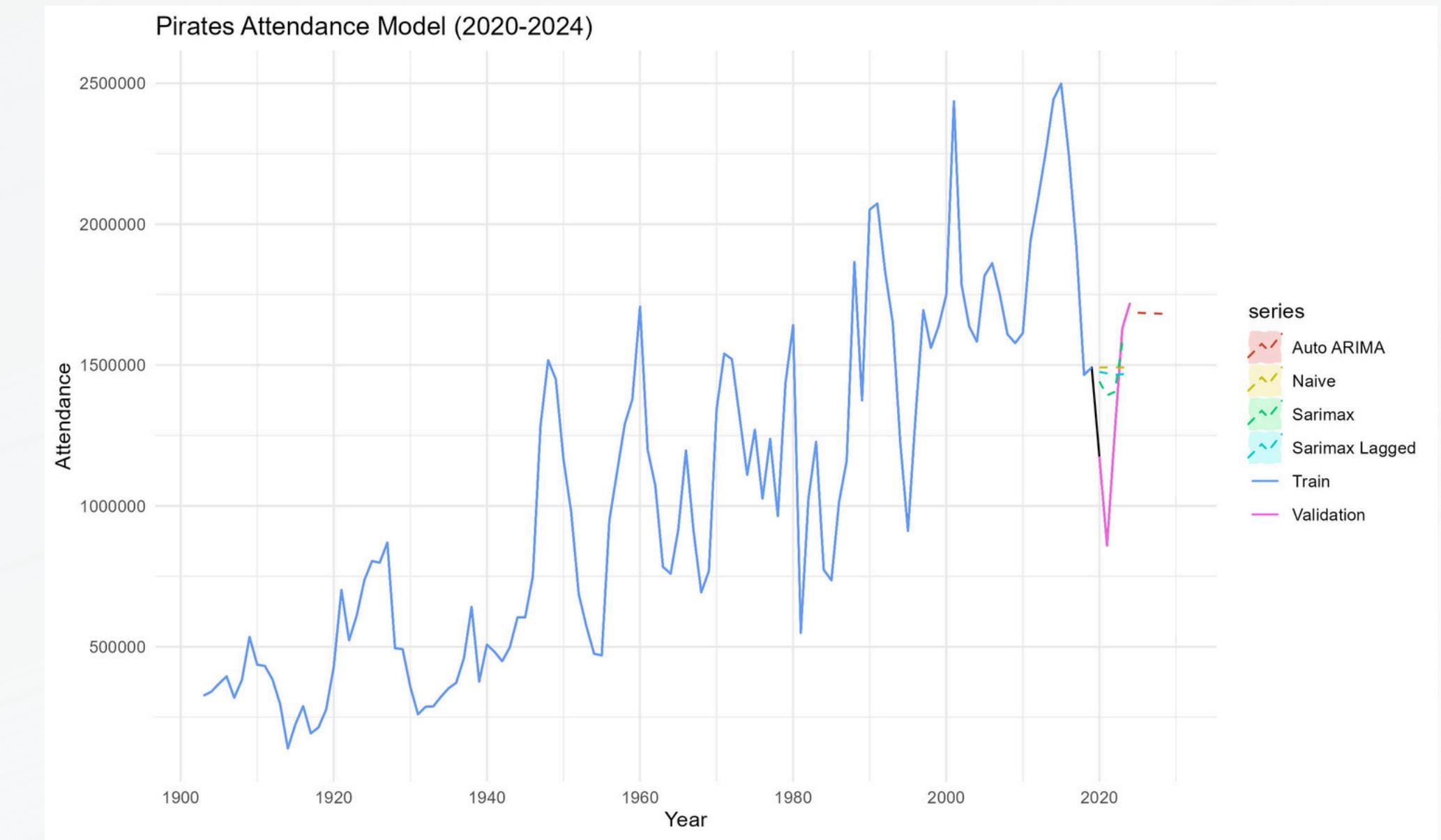
MOVING AVERAGE AND HOLT

Test Error (MAPE)			
	White Sox	Tigers	Pirates
Naive	8.953	16.460	28.171
MA	9.650	51.195	54.137
Holt	10.032	15.578	28.302



ARIMA

	Test Error (MAPE)		
	White Sox	Tigers	Pirates
Naive	8.953	16.460	28.171
Auto ARIMA	8.953	16.460	28.171
SARIMAX	11.413	32.120	21.577
Lagged SARIMAX	8.796	16.449	27.396

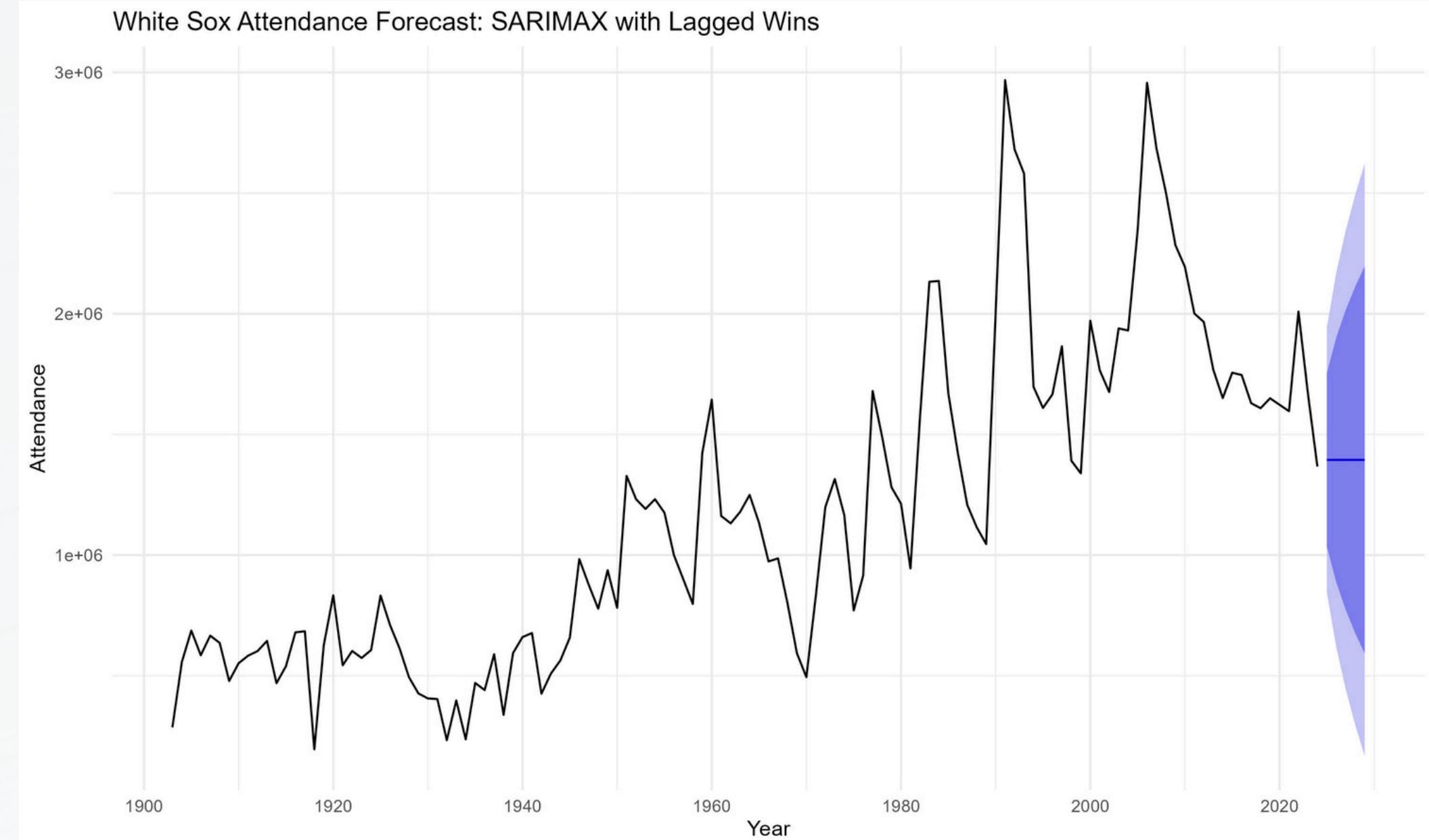


MODEL SELECTION: WHITE SOX

Method Selected:
SARIMAX with Lagged Wins

Benefits:

- Lowest MAPE
- SARIMAX allows for exogenous variables to be included
- Last year's wins influence the upcoming year's attendance

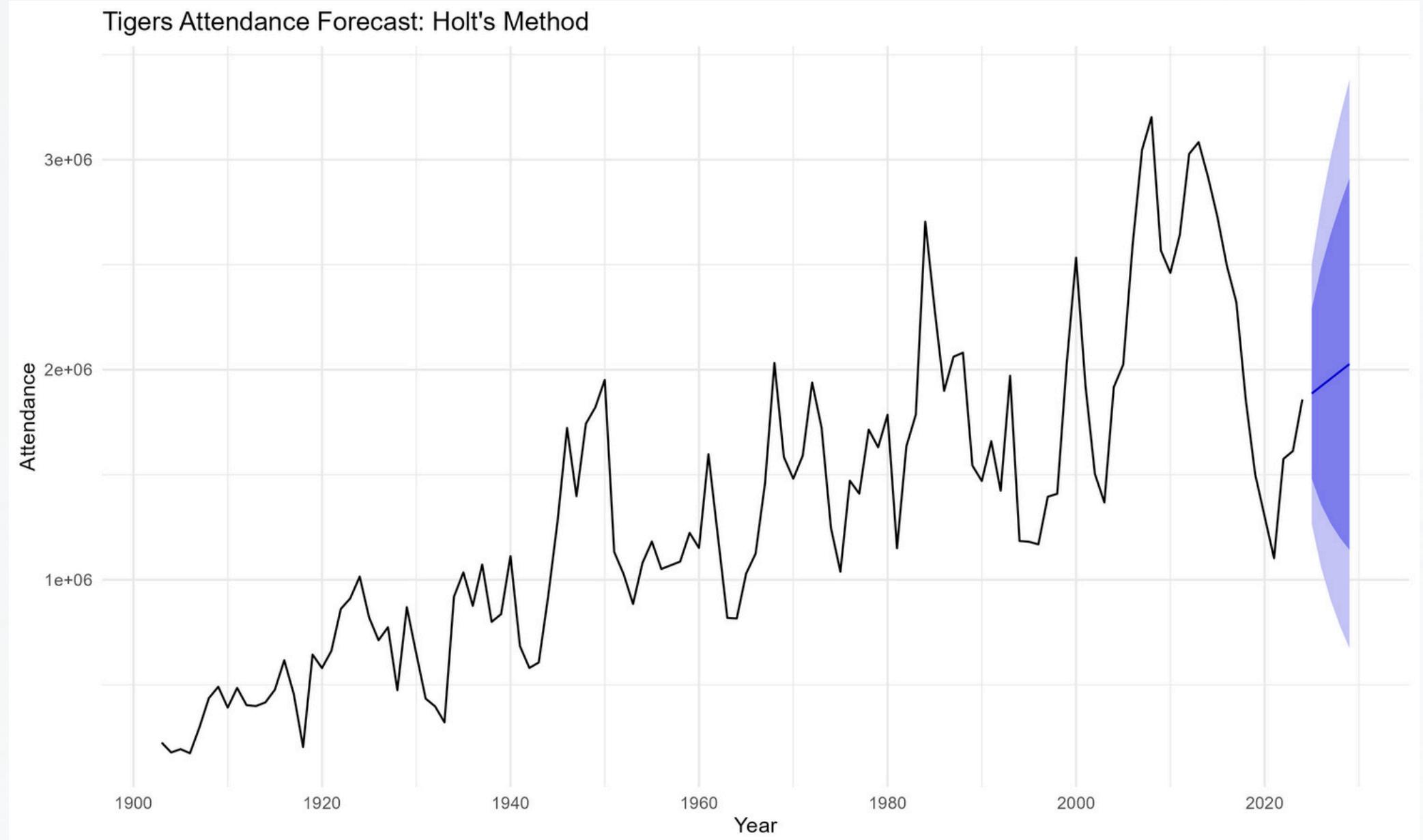


MODEL SELECTION: TIGERS

Method Selected:
Holt's Method

Benefits:

- Lowest MAPE
- Model is responsive over time to trend changes
- Works well with forecasting a few periods ahead

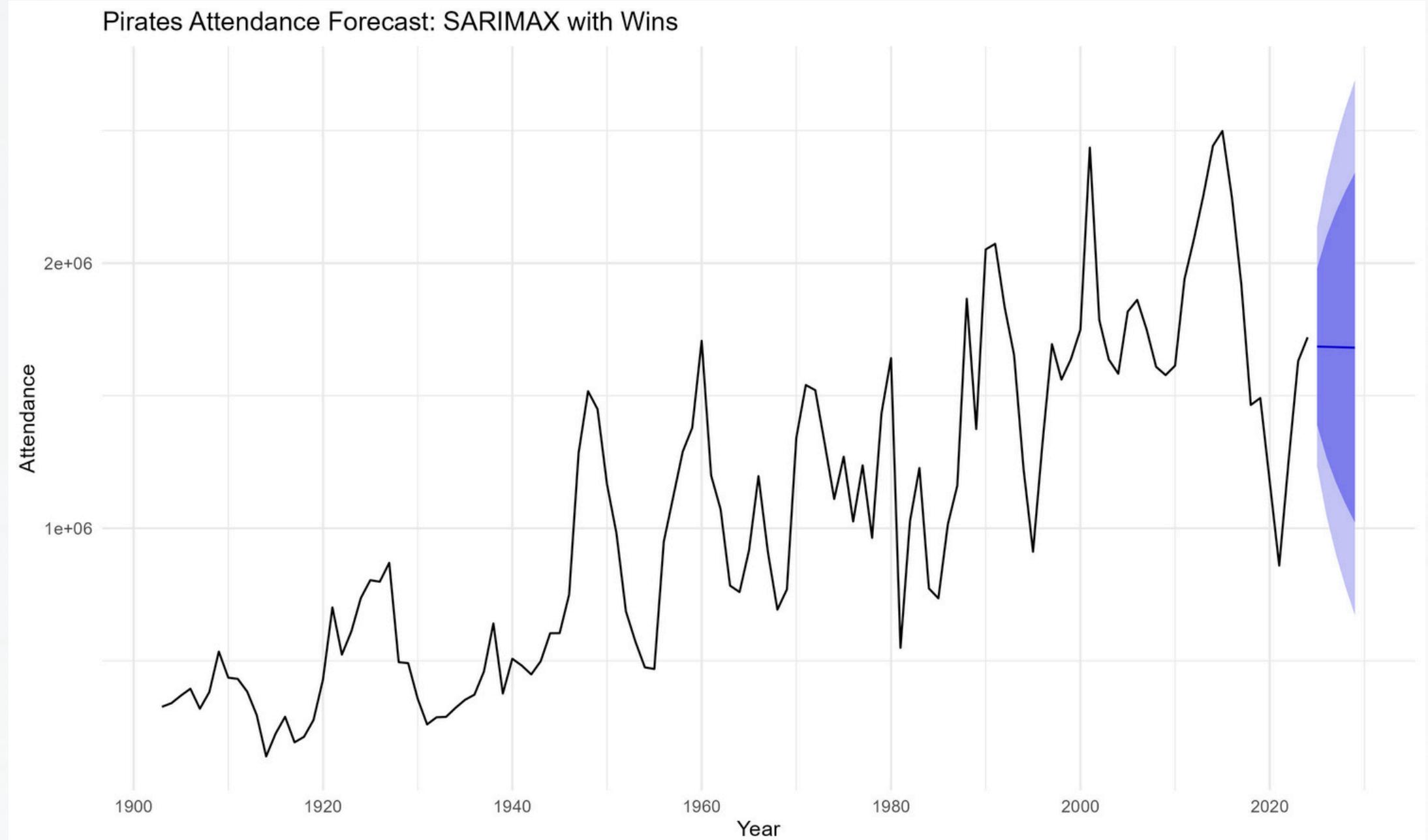


MODEL SELECTION: PIRATES

Method Selected:
SARIMAX with Wins

Benefits:

- Lowest MAPE
- SARIMAX allows for exogenous variables to be included
- Attendance moves with current team success



CONCLUSIONS



MLB Executives should look into implementing a salary cap to maintain a competitive balance across the league

More wins for smaller market teams increase overall fan engagement

LEAGUE LEVEL



Owners must invest in their teams and increase their payrolls as wins are a good predictor of attendance

A higher payroll leads to better players, a better team, and more wins

OWNER LEVEL



Fans have a powerful voice that can drive real change for management

If you're frustrated with your team, don't go to games

FAN LEVEL

THANK YOU!

Go Phils!

