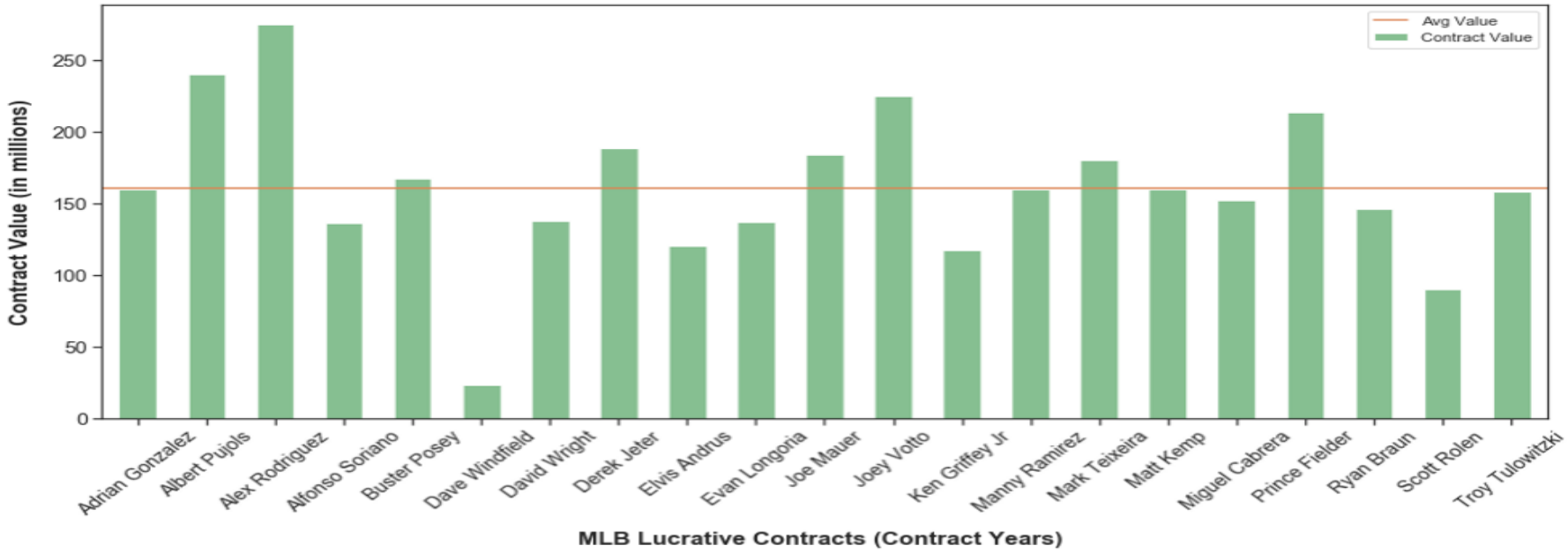
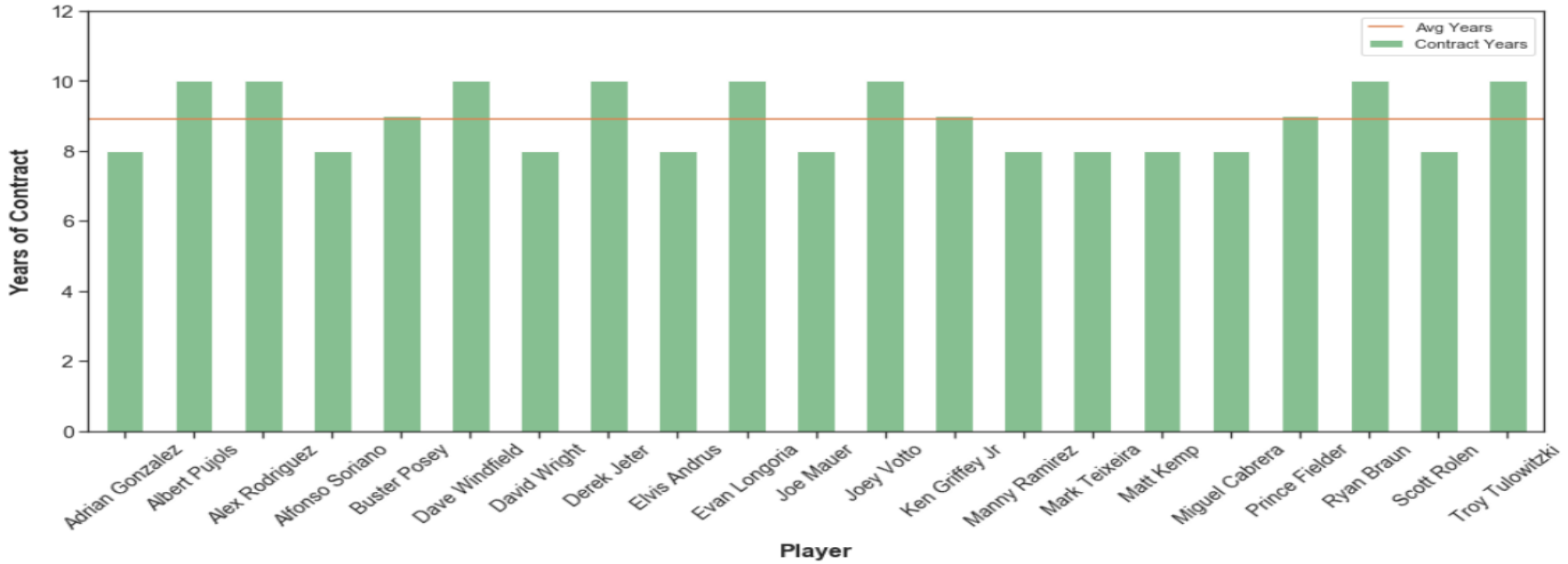
Baseball Most Talented Players

- Big Contracts in Major League Baseball are Good for Players
  - Multi-million-dollar contracts
  - Multi-year contracts
- Are They Good for the Owners of Baseball
  - Is there a Return on Investment
  - What is their Future Yearly Performance

Baseball Most Lucrative Contracts

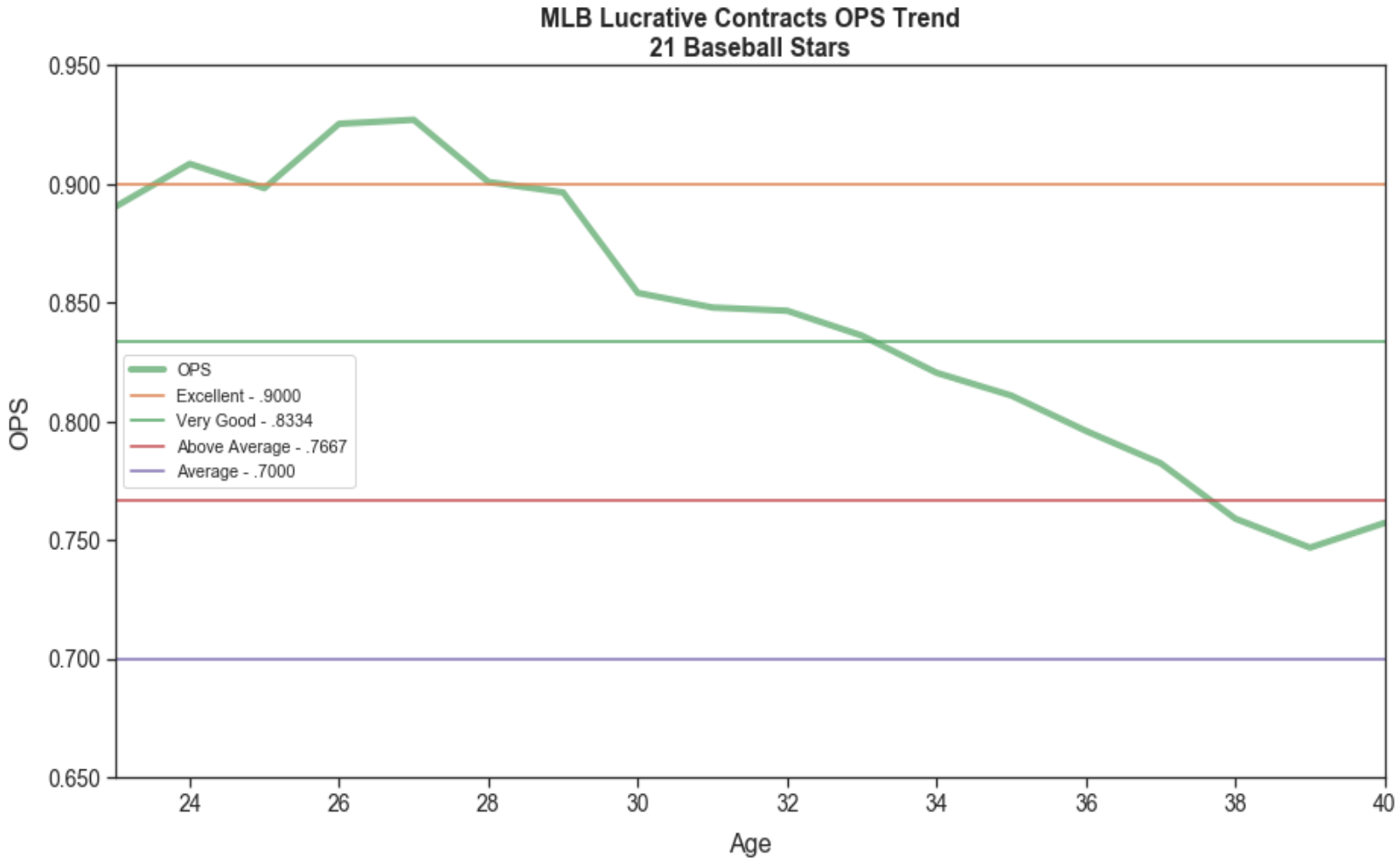




Source: [Fox Sports Article]

Combined Player Performance

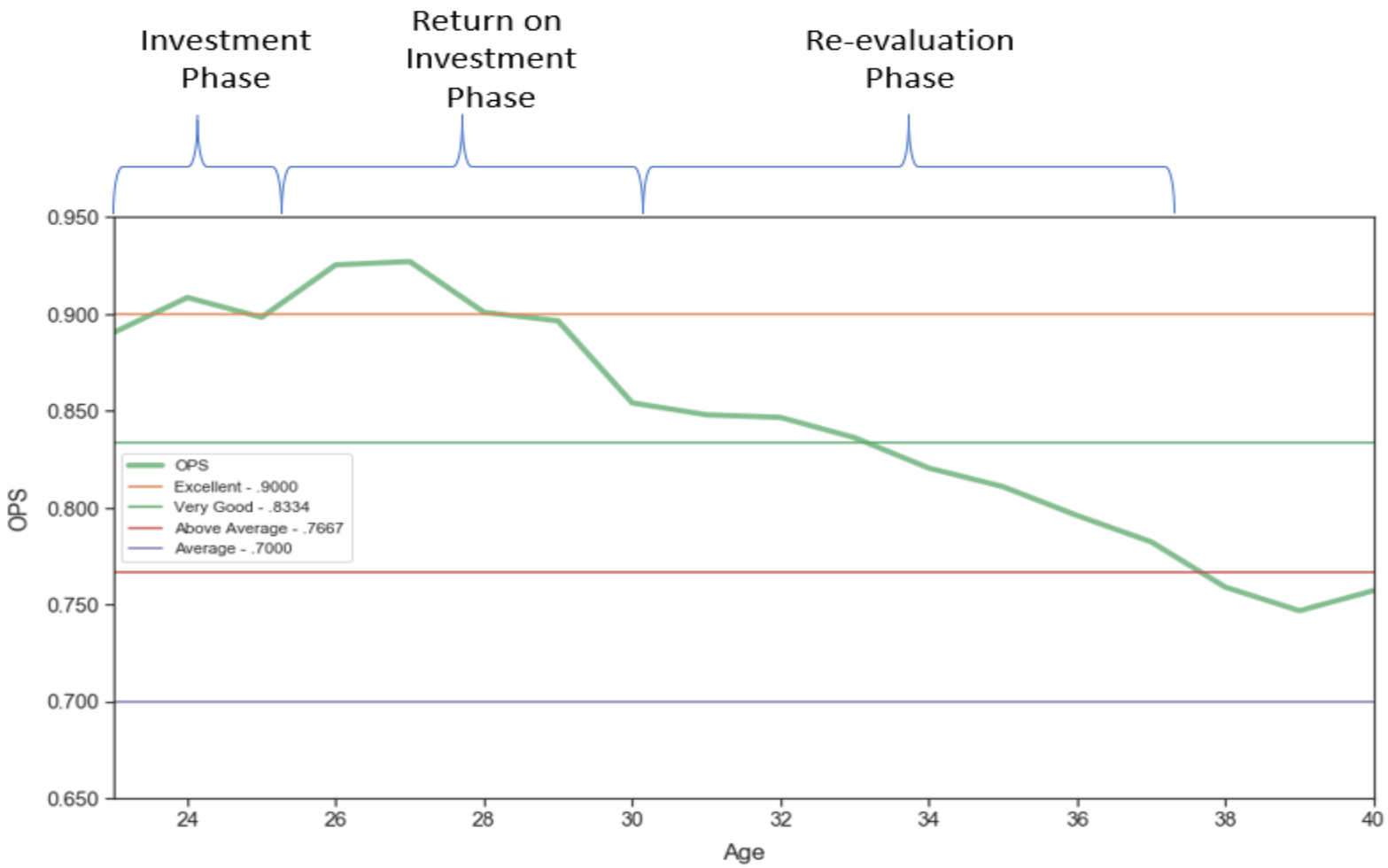
- Average Signing Age: 28
- Average Contract Years: 8.9
- Average Contract Value: $160 million
- Performance Declines at Age 28
- Continues to Decline Rapidly



Source: [Fox Sports Article]

Is There a Better Way

- Investment Period
  - Initially Sign 2 to 4 Years
  - Track Performance
- Return On Investment Period
  - Sign to Multi-Year Contract
  - Sign to Multi-Million Dollar Contract
  - Less Dollar Value but Substantial
  - Sign During Optimal Years
- Re-Evaluate Contract
  - Declining Years
  - Still May be Value



Source: Fox Sports Article

Keys to Success

- Predict Performance
  - Predict ROI Period – Five Years
  - Given 2 to 4 Years of Known Performance
- Create Baseline Predictive Model
  - OPS Predictive Model
  - Career OPS Predictive Model
  - One Year Look Ahead
- Create Five Year Projections
  - Explore Techniques
  - Input into Predictive Model
  - Analyze Results

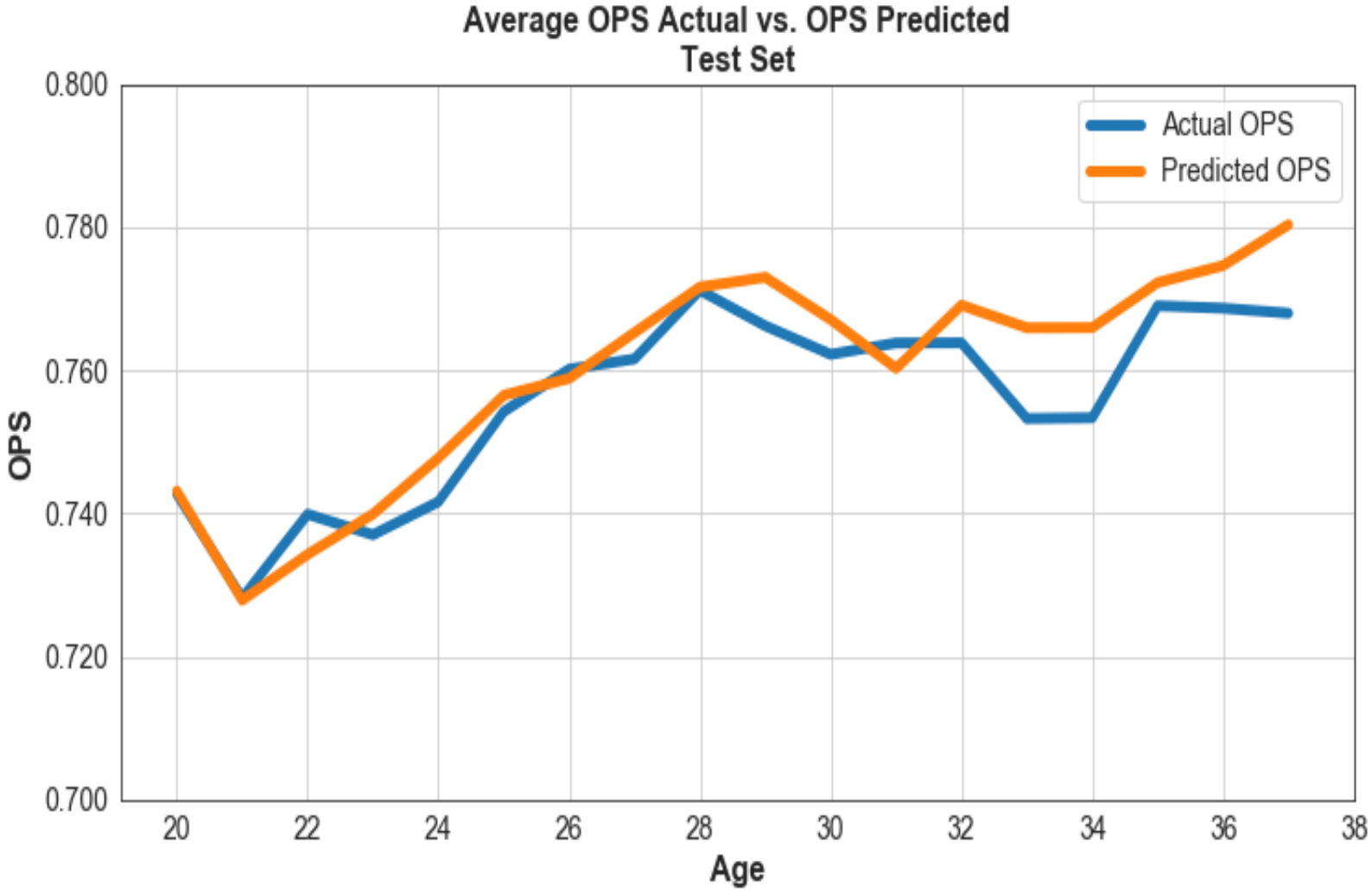
Source: Fox Sports Article

Process

- Acquire and Process Data
  - Lahman Baseball Statistics Data
    - Yearly Baseball Statistics
    - 1871 to 2018
  - Format Data into Usable Format
  - Validate Data Against FanGraphs
- Perform Exploratory Data Analysis
  - Understand the Data
  - Look for Insight in Data
- Statistical Analysis
  - What Does Performance Data Look Like Statistically
  - Helps to Better Understand Data
  - Use Statistical Techniques
- Predictive Models
  - Predict OPS (On Base Plus Slugging)
  - Predict Career OPS

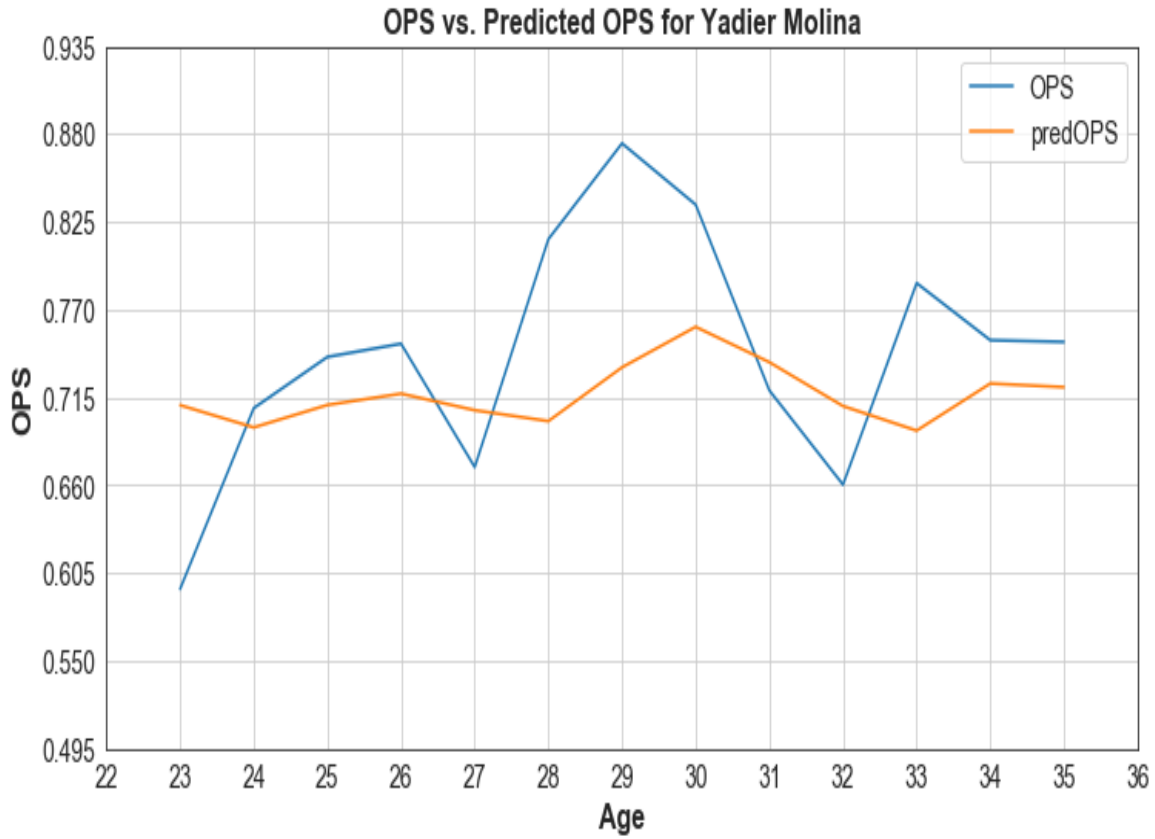
OPS Predictive Results - Charts

- One Year Predictions
- Averaged Over All Players
- Sample Required 300+ Yearly At Bats
- Later Years Have Greater Variation
- Easier To Predict Early Years

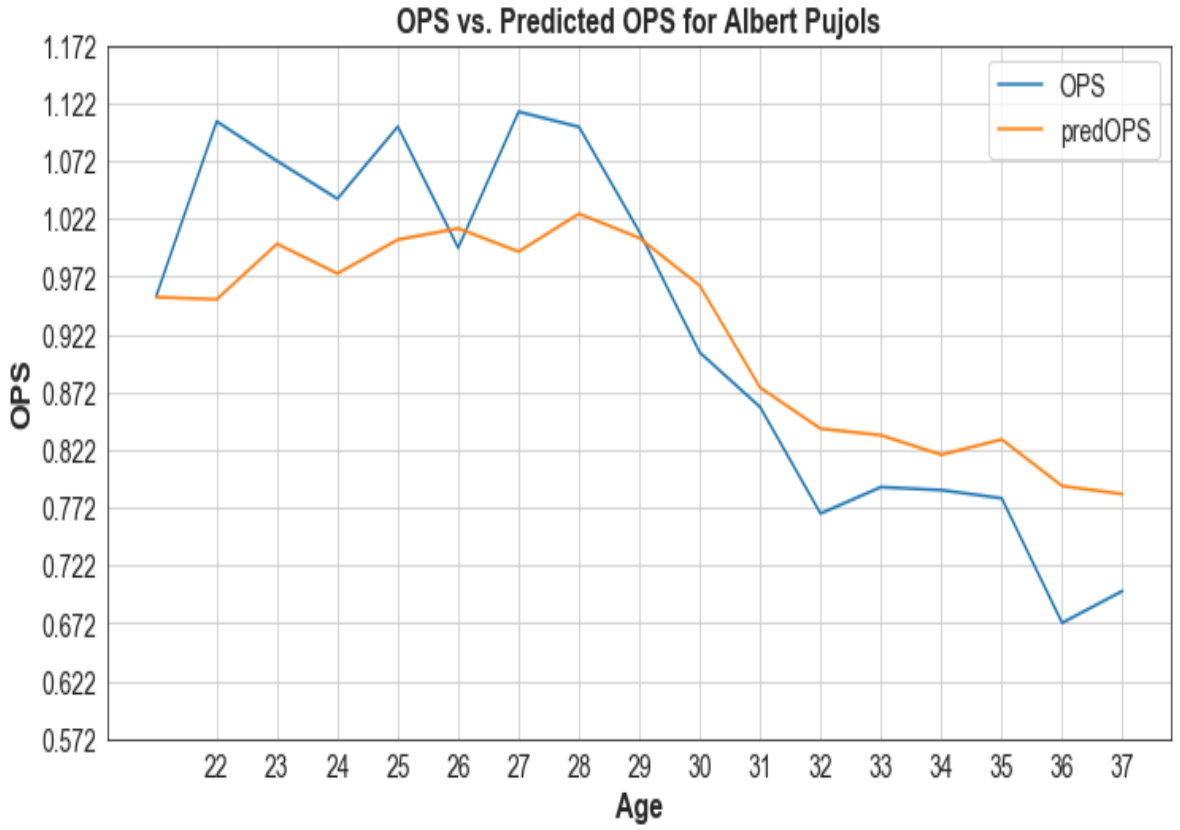


OPS Predictive Results – Selected Players

Player Name: Yadier Molina
Avg Actual OPS 0.743
Avg Predicted OPS 0.717
Pct Error 3.5



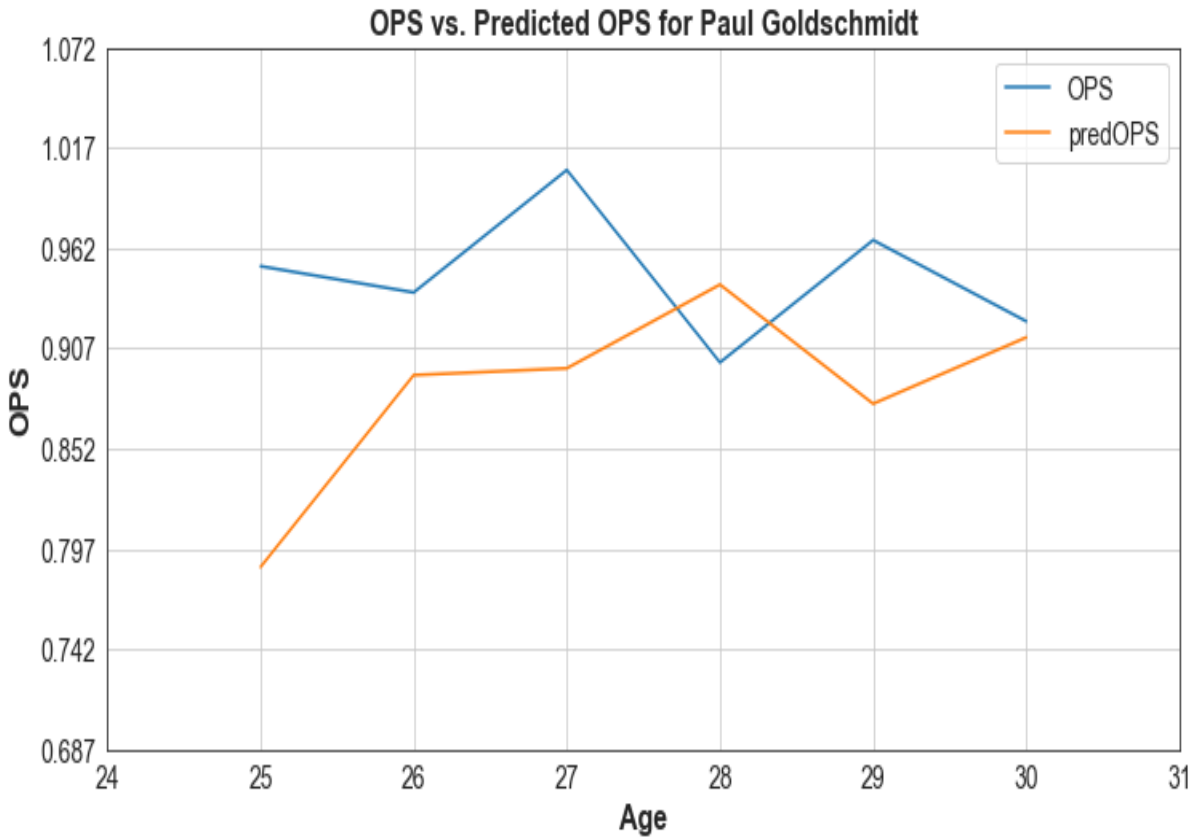
Player Name: Albert Pujols
Avg Actual OPS 0.927
Avg Predicted OPS 0.921
Pct Error 0.6



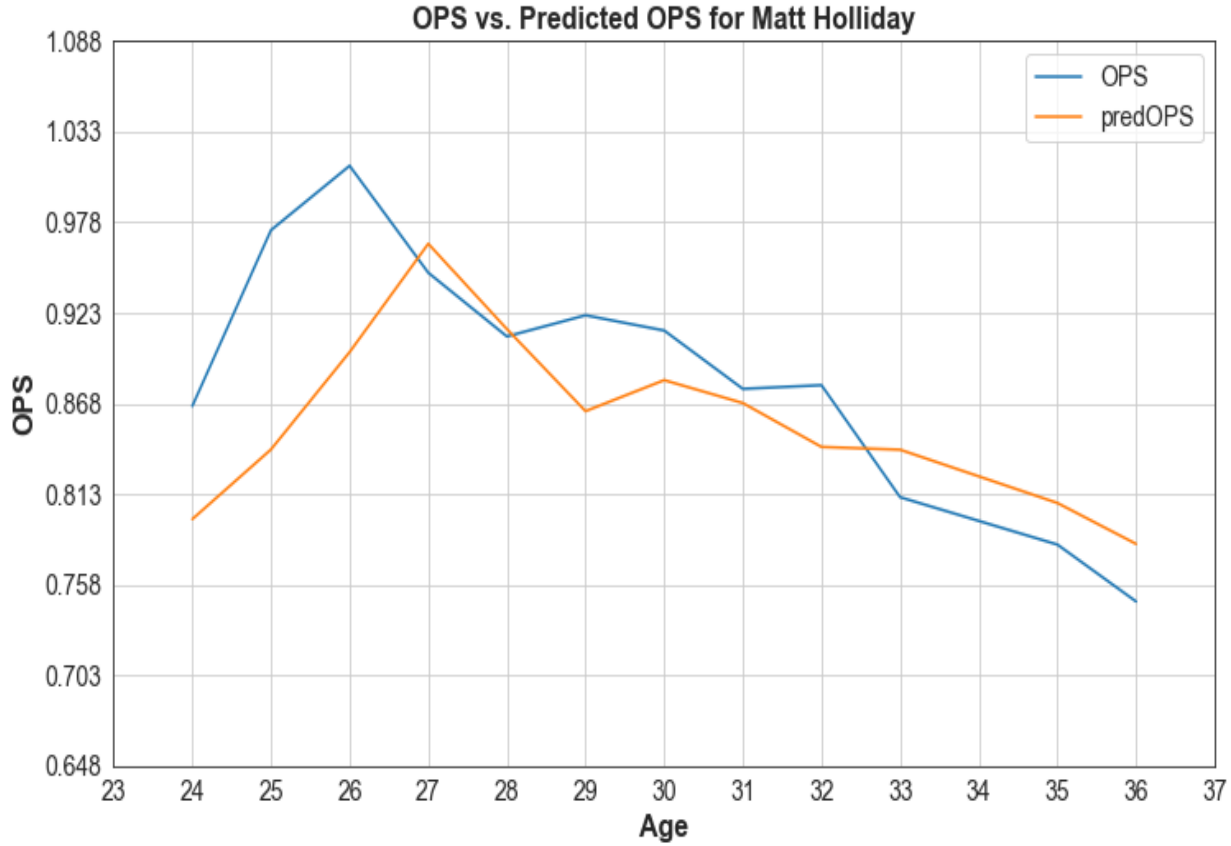
Some players can reasonably be predicted. Some are not.

OPS Predictive Results – Selected Players

Player Name: Paul Goldschmidt
Avg Actual OPS 0.947
Avg Predicted OPS 0.885
Pct Error 6.6



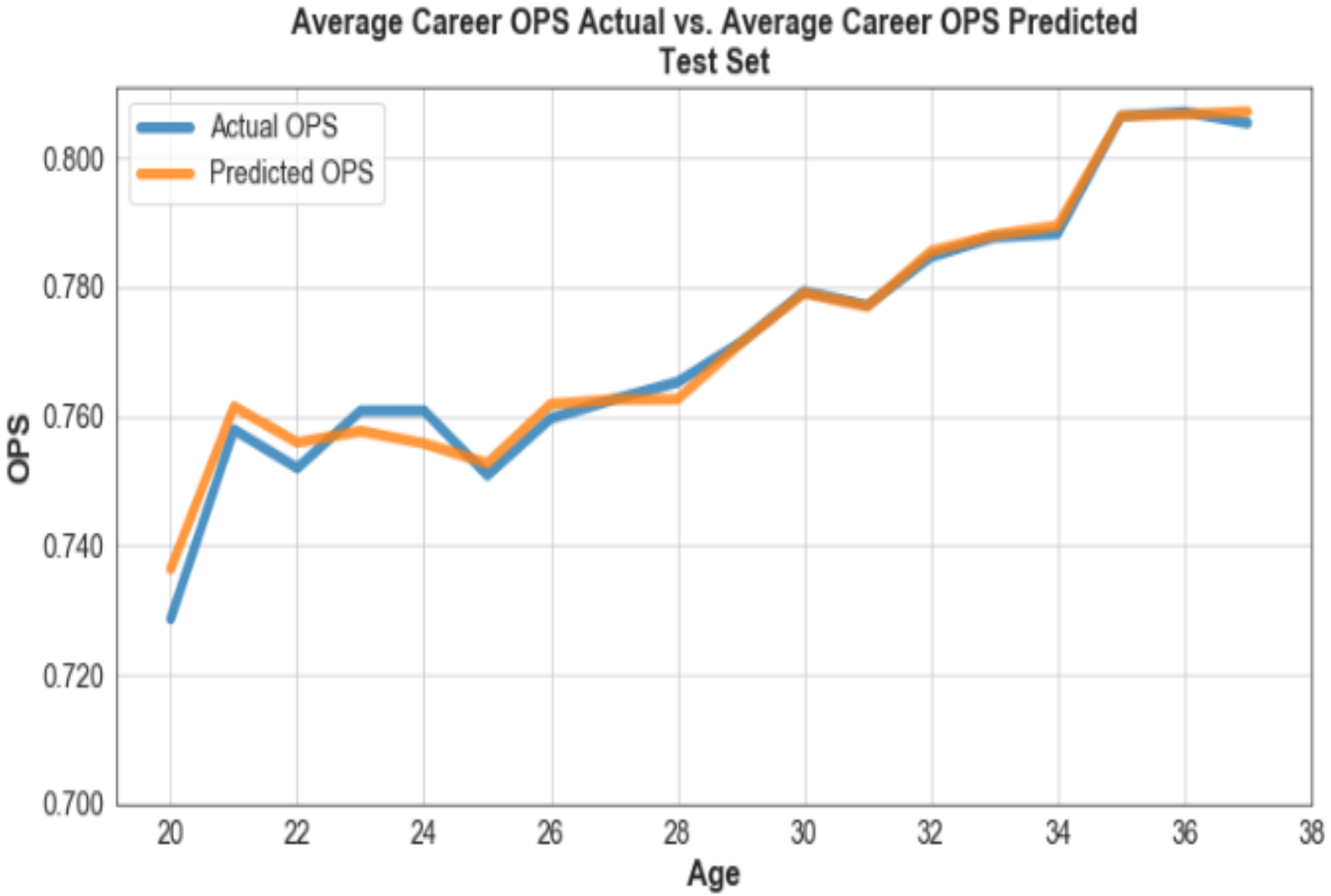
Player Name: Matt Holliday
Avg Actual OPS 0.887
Avg Predicted OPS 0.858
Pct Error 3.2



Some players can reasonably be predicted. Some are not.

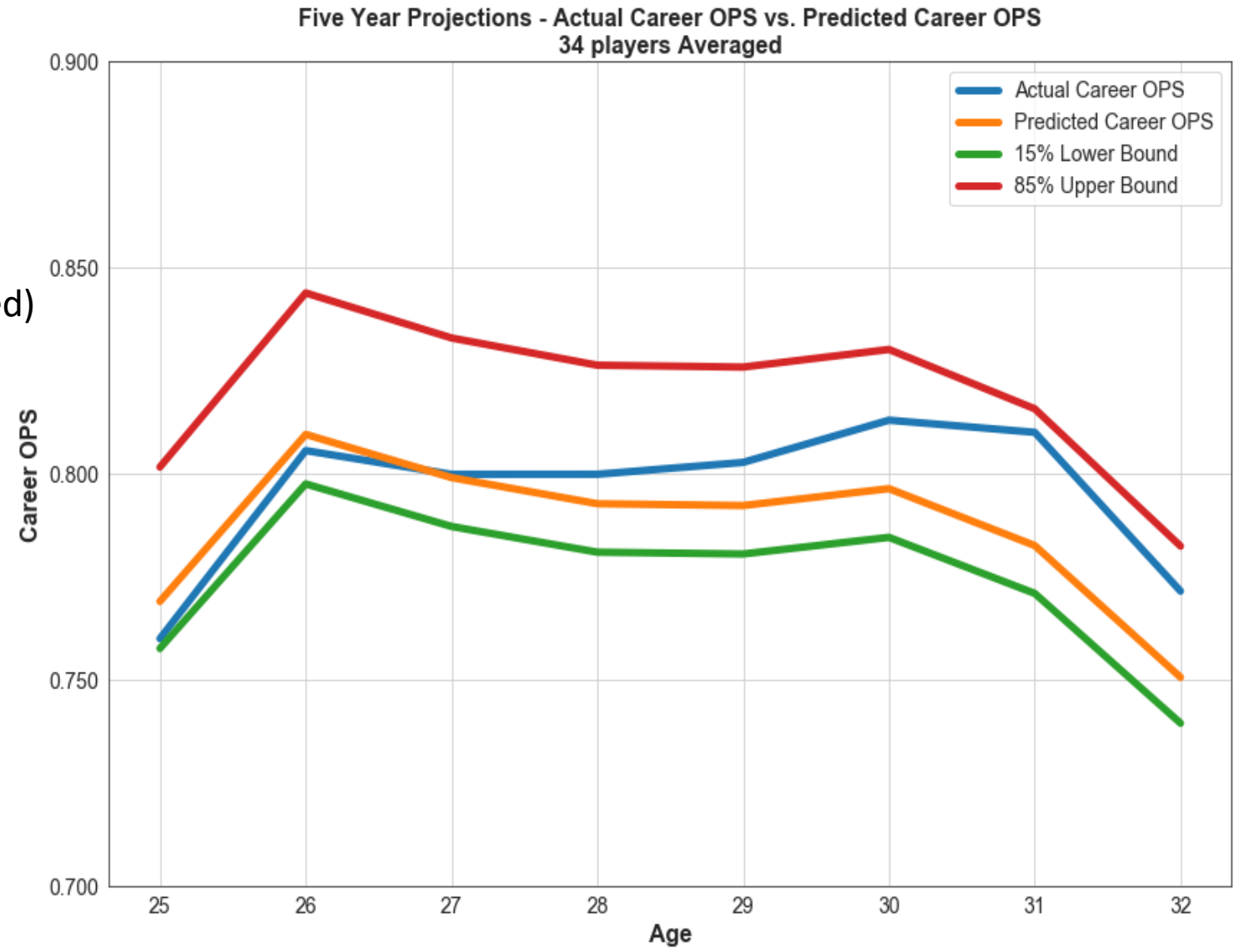
Career OPS Predictive Results - Charts

- One Year Predictions
- Averaged Over all Players
- Sample Required 300+ At Bats
- Low Variability
- Stable Model



Career OPS Five Year Predictive Results - Charts

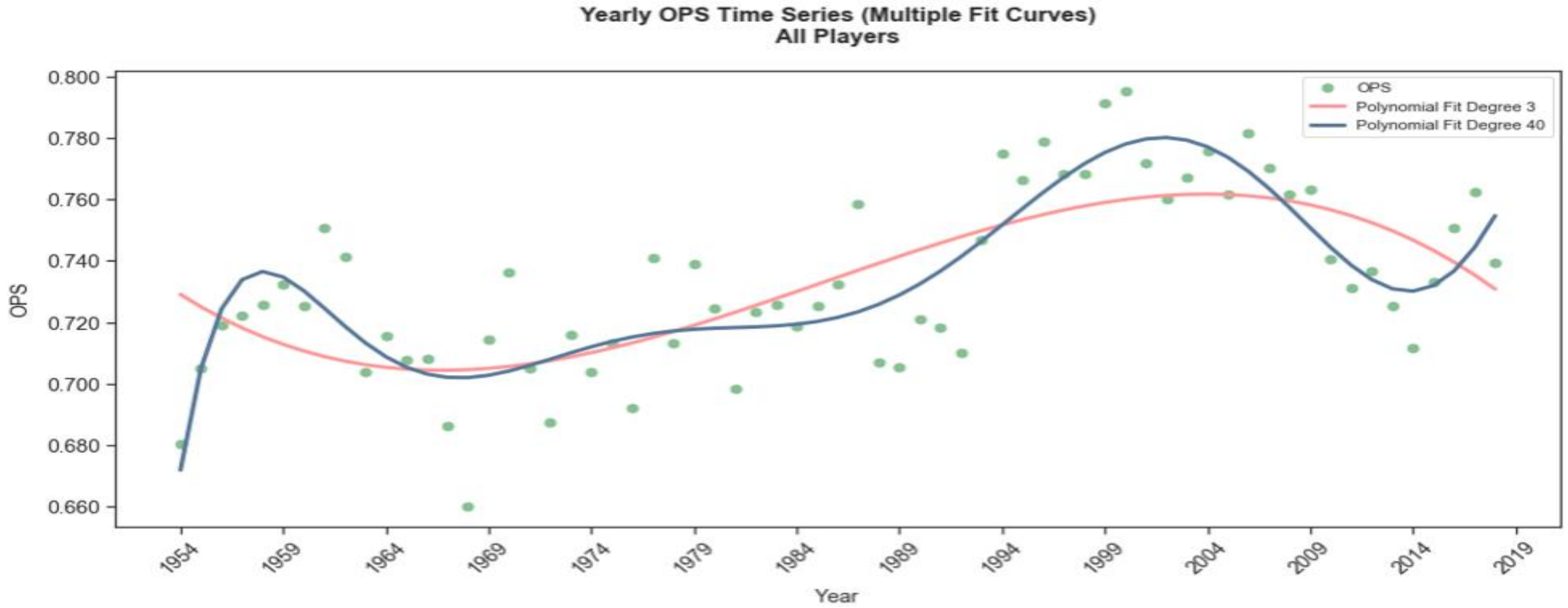
- Five Year Predictions
- Averaged Over 34 Players (randomly selected)
- Sample Required 300+ Yearly At Bats
- Prediction Capability
  - Good for 70% Certainty
  - Early Years Are More Accurate
- Works for Two Known Years of Performance



Steroid Era in Baseball

- Steroid Era Timeframe
  - ESPN says Late 1980’s to Mid 2000
  - Other Definitions 1994 to 2004
  - Steroid Testing Implemented in 2004
- Was There Benefit
  - Did Players Benefit From Steroids
  - Is There Clear Evidence

Steroid Era in Baseball



- Two Curves Charted (one properly fitted, one overfitted)
- Trend Shows OPS Performance Increase Starting in Late 1960's, Early 1970's
- Continues to Trend Upward Through Early 2000's
- Cannot Say Conclusively Steroid Era Benefited Players Compared to Other Timelines
- More Research Necessary

Thank You!