SPEED, STRIKEOUTS, (BASE ADVANCEMENT), AND SCORING

MARK D. PANKIN
INTRODUCTION

◆ INVESTIGATE EFFECTS ON SCORING OF

  ● FAST RUNNERS
  ● TEAM STRIKEOUTS
  ● ADVANCING RUNNER FROM 2nd TO 3rd

◆ PRIMARY RESEARCH TOOL: MARKOV PROCESS MODEL

  ● BASED ON TRANSITION PROBABILITIES BETWEEN THE RUNNERS & OUTS SITUATIONS
  ● USES MATRIX ALGEBRA TO COMPUTE ALL POSSIBILITIES
  ● FAST ALTERNATIVE TO SIMULATION
  ● CALCULATES LONG-TERM AVERAGE RUNS PER GAME FOR A SPECIFIED LINEUP

  ● APPLICATIONS:
    * EFFECTS OF PLAYER PERFORMANCE ON SCORING
    * STRATEGY ANALYSIS
    * FINDING THE BEST BATTING ORDER
**KEY ASSUMPTIONS**

- PLAYERS HIT THE SAME IN ALL SITUATIONS EXCEPT WALK FREQUENCY ADJUSTED FOR RUNNERS & OUTS SITUATIONS, PITCHER BATTING NEXT

- ADVANCEMENT ON HITS AND OUTS BASED ON BATTER HAND AND RUNNER SPEED (1984-92 DATA)

- DOUBLE PLAYS, REACHING ON ERRORS BASED ON BATTER HAND, BATTER AND RUNNER SPEEDS (84-92)

- WP, PB, BALKS ACCORDING TO 1984-92 ML AVERAGES

- SB ATTEMPTS WITH RUNNER ON FIRST ONLY

- SACRIFICE BUNT TRIES BY PITCHERS ONLY
SPEED: RICKEY HENDERSON IN 1990

◆ MVP IN 1990

◆ 1990 PERFORMANCE AND ALTERNATIVES

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<tr>
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<th>BA</th>
<th>OBP</th>
<th>SLG</th>
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◆ STUDY METHOD: USE MODEL TO GET 1990 OAKLAND SCORING WITH EACH OF THE 4 ALTERNATIVES AS LEADOFF BATTER

• USE 1990 AS THE BASELINE

• COMPARE SCORING RESULTING FROM THE OTHER 3

• LINEUP:

  LEADOFF (4 ALTERNATIVES)
  LANSFORD
  CANSECO
  McGWIRE
  D. HENDERSON
  STEINBACH
  JOSE
  WEISS
  GALLEG
SPEED AND SCORING ANALYSIS RESULTS

◆ SCORING COMPARISON TO 1990 BASELINE

<table>
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<th>RUNS/GAME</th>
<th>RUNS/162 GAMES</th>
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<td>“VINCE”</td>
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◆ EXTRA 43 SB, 9 CS HAS LITTLE EFFECT (RICKEY+)

◆ SLOW RUNNER, NO SB TRIES WOULD COST 1 GAME PER SEASON (“CECIL”) BASED ON 10 RUNS PER WIN

◆ RICKEY’S BATTING PERFORMANCE WORTH 7-8 WINS COMPARED TO “VINCE”
STRIKEOUTS: 1991 TIGERS

◆ SET AL RECORD FOR TEAM Ks IN A SEASON: 1185

◆ METHOD OF ANALYSIS: COMPARE MODEL ESTIMATES OF TEAM SCORING AT VARIOUS LEVELS OF STRIKEOUTS

  • USE 1991 FULL SEASON STATS (PHILLIPS, WHITAKER, TRAMMELL, FIELDER, TETTLETON, FRYMAN, DEER, INCAVIGLIA, CUYLER) AS THE BASELINE
  
  • SCALE BACK Ks TO 747 (TWINS Ks, LOWEST IN ML)
  
  • NO STRIKEOUTS AT ALL
  
  • ALSO ESTIMATE TWINS SCORING WITH 1185 Ks

◆ SCORING COMPARISONS TO BASELINE (ASSUMES ONLY CHANGE IS IN NUMBER OF STRIKEOUTS)

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<td>TWINS: 1185 Ks</td>
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BASE ADVANCEMENT: RUNNER ON 2nd, 0 OUTS
(2,0)

◆ USE TEAM CONSISTING OF ALL THE SAME BATTER

- AL 1993 AVERAGE (LEAGUE TOTALS/14/9)
- RICKEY HENDERSON IN 1990

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◆ COMPARE TO BASELINE SCORING LEVELS:

- RUNNER ADVANCES ON EVERY NON-K OUT (1984-92 AVERAGE IS ABOUT 50%)

- REDUCE BATTING AVERAGE (WALKS UNCHANGED) IN (2,0) ONLY UNTIL SCORING IS REDUCED TO BASELINE LEVEL

- REPEAT PROCESS ASSUMING NEVER ADVANCE ON NON-K OUTS, AND INCREASE BATTING AVERAGE IN (2,0) ONLY UNTIL SCORING INCREASES TO BASELINE
ADVANCEMENT IN (2,0) RESULTS

◆ BASELINE SCORING

- ALL 1993 AL AVG TEAM: 5.032 RUNS PER GAME
- ALL 1990 RICKEY TEAM: 10.357 RUNS PER GAME

◆ SCORING WHEN ALWAYS ADVANCE (2,0) --> (3,1) ON NON-K OUTS

- ALL AL AVERAGE TEAM
  * WITH NO CHANGE IN BATTING AVG: 5.071 R/G (INCREASE OF 6 RUNS PER 162 GAMES)
  * A DECREASE IN BATTING AVERAGE OF 22% IN (2,0) WILL REDUCE SCORING TO THE BASELINE LEVEL

- ALL 1990 RICKEY HENDERSON TEAM
  * WITH NO CHANGE IN BATTING AVG: 10.432 R/G (INCREASE OF 12 RUNS PER 162 GAMES)
  * A DECREASE IN BATTING AVERAGE OF 12% IN (2,0) WILL REDUCE SCORING TO THE BASELINE LEVEL
ADVANCEMENT IN (2,0) RESULTS (CONTINUED)

◆ SCORING WHEN NEVER ADVANCE (2,0) --> (3,1) ON NON-K OUTS

- ALL AL AVERAGE TEAM
  * WITH NO CHANGE IN BATTING AVG: 4.987 R/G (DECREASE OF 7 RUNS PER 162 GAMES)
  * A INCREASE IN BATTING AVERAGE OF 20% IN (2,0) WILL RAISE SCORING TO THE BASELINE LEVEL

- ALL 1990 RICKEY HENDERSON TEAM
  * WITH NO CHANGE IN BATTING AVG: 10.265 R/G (DECREASE OF 15 RUNS PER 162 GAMES)
  * A INCREASE IN BATTING AVERAGE OF 13% IN (2,0) WILL RAISE SCORING TO THE BASELINE LEVEL

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SUMMARY AND CONCLUSIONS

- HIGH SB/FAST RUNNERS DO NOT INCREASE SCORING BY VERY MUCH
  - A RICKEY HENDERSON ADDS ABOUT 1 WIN A SEASON COMPARED TO A NO SB/SLOW RUNNER
  - A LOW OBP/HIGH SB PLAYER DOES NOT CONTRIBUTE MUCH TO THE OFFENSE, AND HURTS SCORING WHEN BATTING LEADOFF

- HIGH STRIKEOUT TEAMS SCORE LESS OTHER THINGS BEING EQUAL
  - DIFFERENCE OF ABOUT 2 WINS PER SEASON BETWEEN 1991 TIGERS AND 1991 TWINS FROM DIFFERENCE IN TEAM STRIKEOUTS
  - BUT TIGERS OFFENSE DEPENDS ON HR (LED 1991 AL WITH 209, 32 MORE THAN #2) AND HIGH OBP DUE TO WALKS (LED WITH 699, 52 MORE), BOTH OF WHICH LEAD TO HIGHER NUMBER OF STRIKEOUTS

- ADVANCING RUNNER IN (2,0) IS WORTH SOME DECREASE IN BATTING AVERAGE
  - ROUGH ESTIMATE: FOR AN AVERAGE PLAYER, INCREASING THE ADVANCEMENT PROBABILITY BY 0.5 OVERCOMES 20% DECREASE IN BA IN (2,0) SITUATION
  - FOR BETTER HITTERS, THE CORRESPONDING DECREASE IN BA IS SMALLER; FOR POORER HITTERS, THAT DECREASE IS LARGER
  - ANALYSIS COULD BE REPEATED FOR SPECIFIC PLAYERS IN A REAL LINEUP
  - OBJECTIVE DURING GAME MAY BE TO SCORE ONE RUN RATHER THAN MAXIMIZE SCORING