

HOW LARGE IS THE ADVANTAGE OF BATTING LAST?

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On the whole, home teams win more games than they lose

- Major league teams typically win 53% to 55% at home
- Many reasons why home teams win more
- Baseball is unique in that one team is assured of being on offense last if needed

Study the advantage of batting last:

- Compare extra inning (including ties after 8) games with others
- Compare home and road winning percentages in games that are "close" after 8
- See if home wins minus losses come in close games or others
- Estimate based on "walk-off" wins

Data from game logs on retrosheet.org

Calculations based on data for "decades" starting in 1901

- Not distorted by a "funny" season or two
- No consistent meaningful differences found between leagues
- No consistent meaningful differences found before and after DH rule
- Non-standard decades
 - ▶ 2000-2011
 - ▶ 10 seasons, 1901-1919 (due to data limitations)

Special case: 1894

- Home team batted first about 40% of the time
- Only 19th C. season since pitcher moved to 60 feet 6 inches in 1893 with sufficient data

EXAMPLE CALCULATION

Compare home teams' winning percent in "extra inning" games with other games

- Extra innings includes games tied after 8 innings even if they ended after 9 innings
- Data for 2000-2011

Total games

- Home team wins 15802
- Road team wins 13342
- Home winning percent: 54.2%

"Extra Inning" games

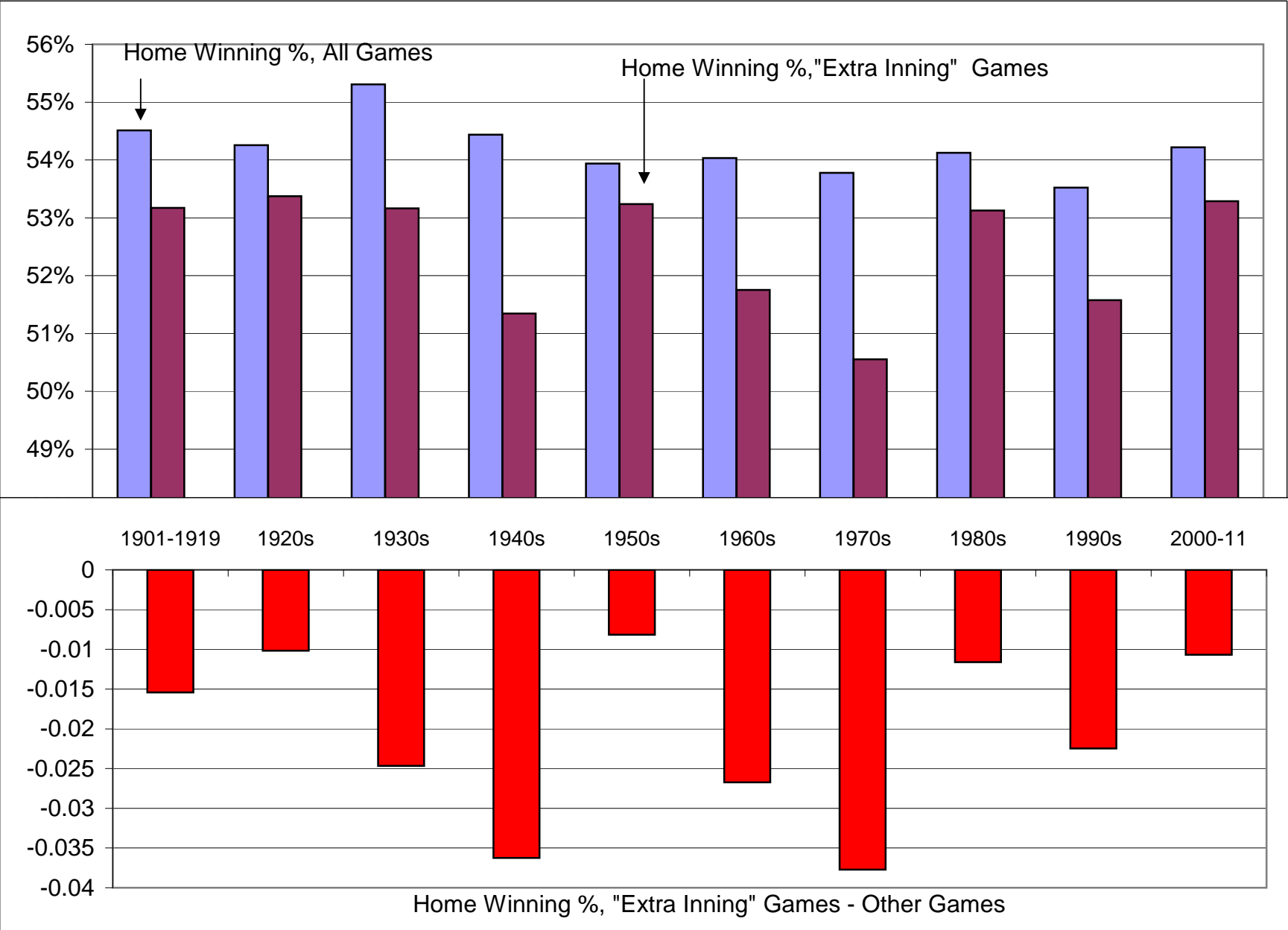
- Home team wins 1971
- Road team wins 1728
- Home winning percent: 53.3%

Games other than extra innings (subtract from total games)

- Home team wins 13831
- Road team wins 11614
- Home winning percent: 54.4%
- Home winning percentage in extra inning games compared to other games: -1.1%

Graph that follows shows these percentages by decade

HOME TEAMS WIN OVER 50%, BUT LESS OFTEN IN "EXTRA INNING" GAMES (includes nine inning games tied after the eighth)



What about nine inning games that are "close" after eight?

Will use the save criterion to define close: 1, 2, 3 runs apart
(Games that are tied after eight are included in extra inning games even if they only went nine)

EXAMPLE CALCULATION

Compare home and road teams winning percents when leading by 1 run after 8 innings.

- 9 inning games only since if tied after 9, it is in the extra inning calculation
- Data for 2000-2011

Home team leading by one run after 8

- Home team wins 2339
- Road team wins 222
- Home winning percent: 91.3%

Road team leading by one run after 8

- Home team wins 241
- Road team wins 2176
- Road winning percent: 90.0%

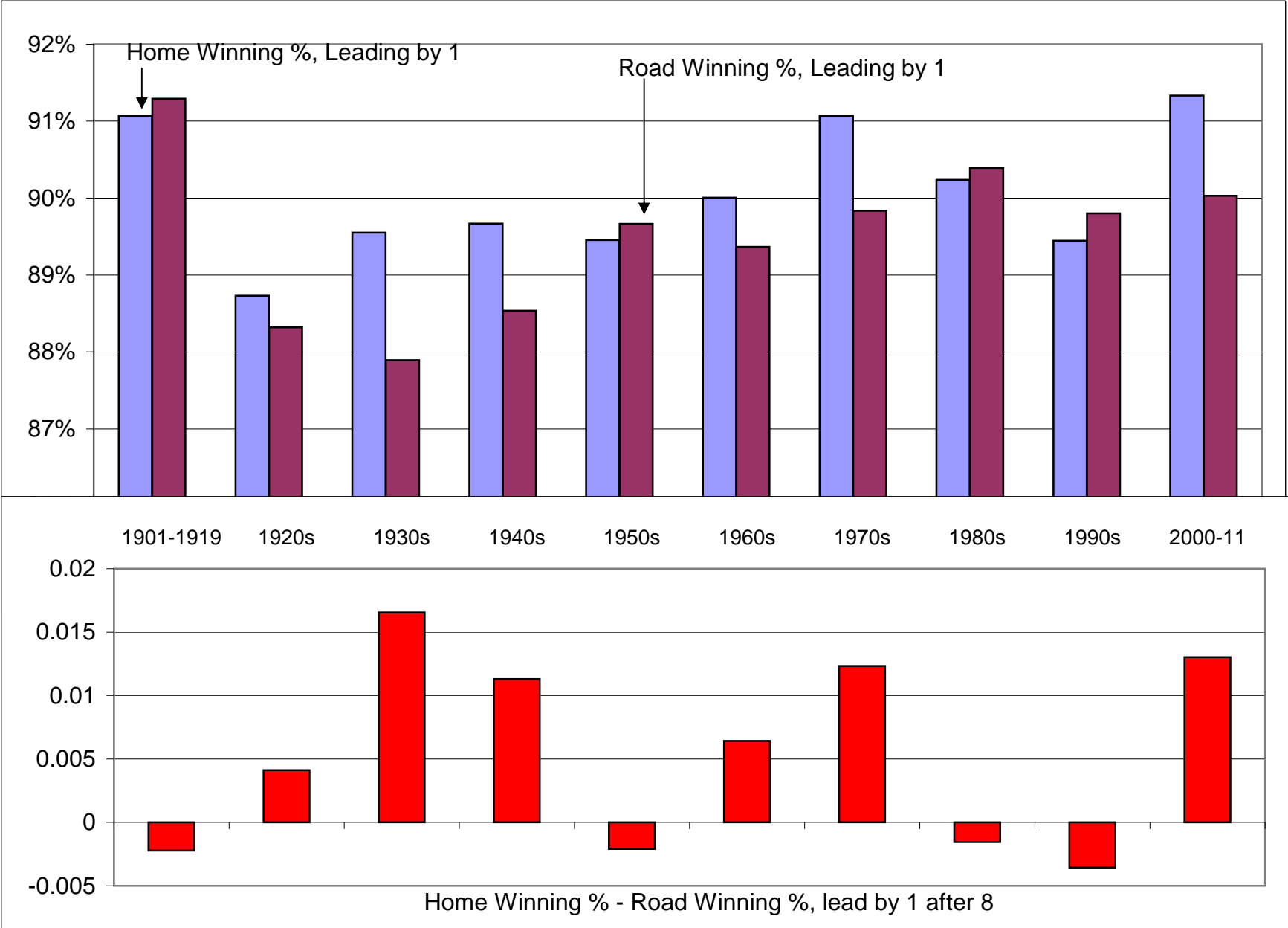
Home team wins 1.3% more often than the road team when leading by 1 after 8 (in 9 inning games)

Graphs that follow shows these percentages by decade for 1, 2, 3 run leads after 8

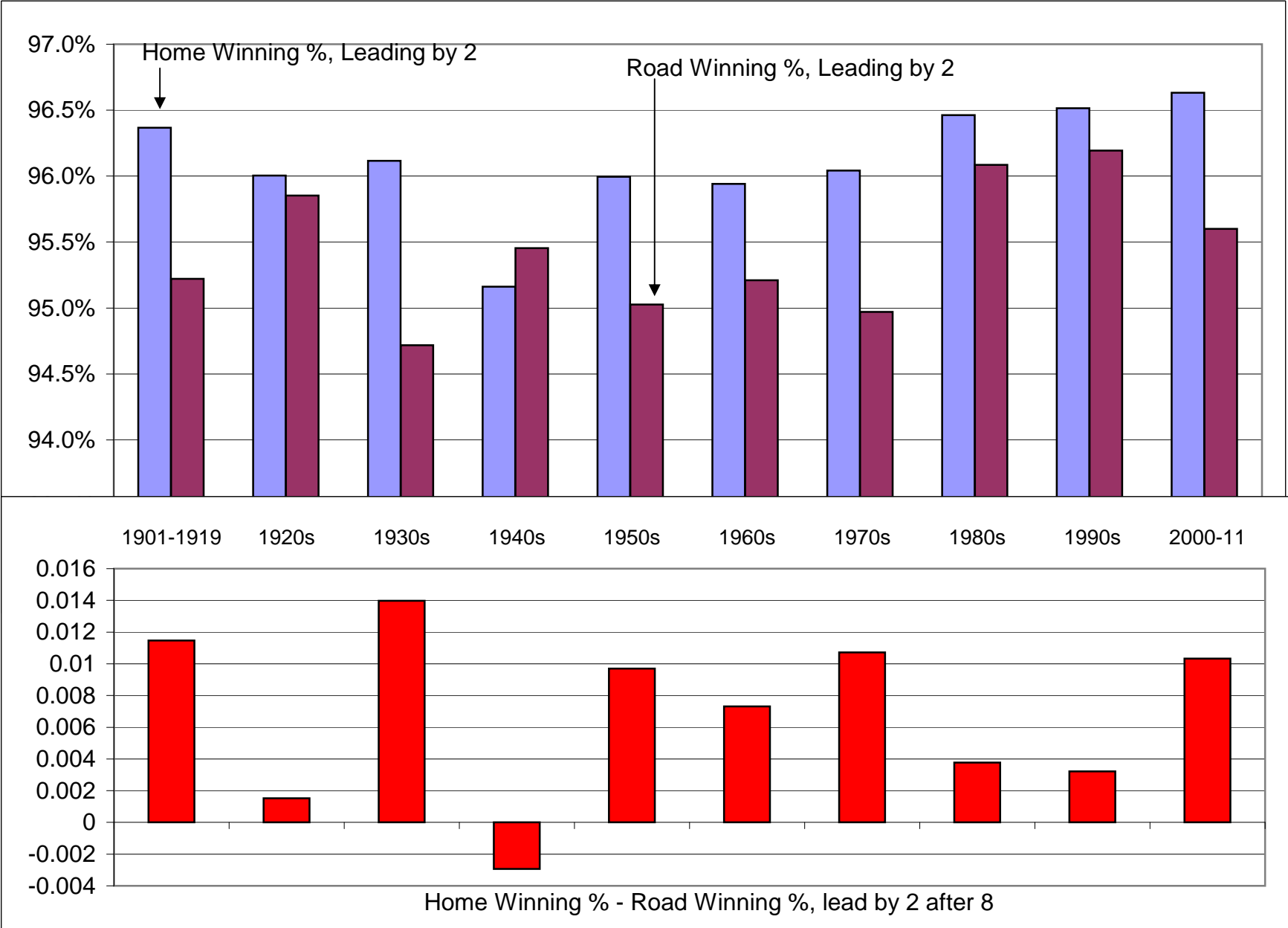
●●● Note that home team was leading by one more often (2561 times vs. 2417)

●●● More on such differences later

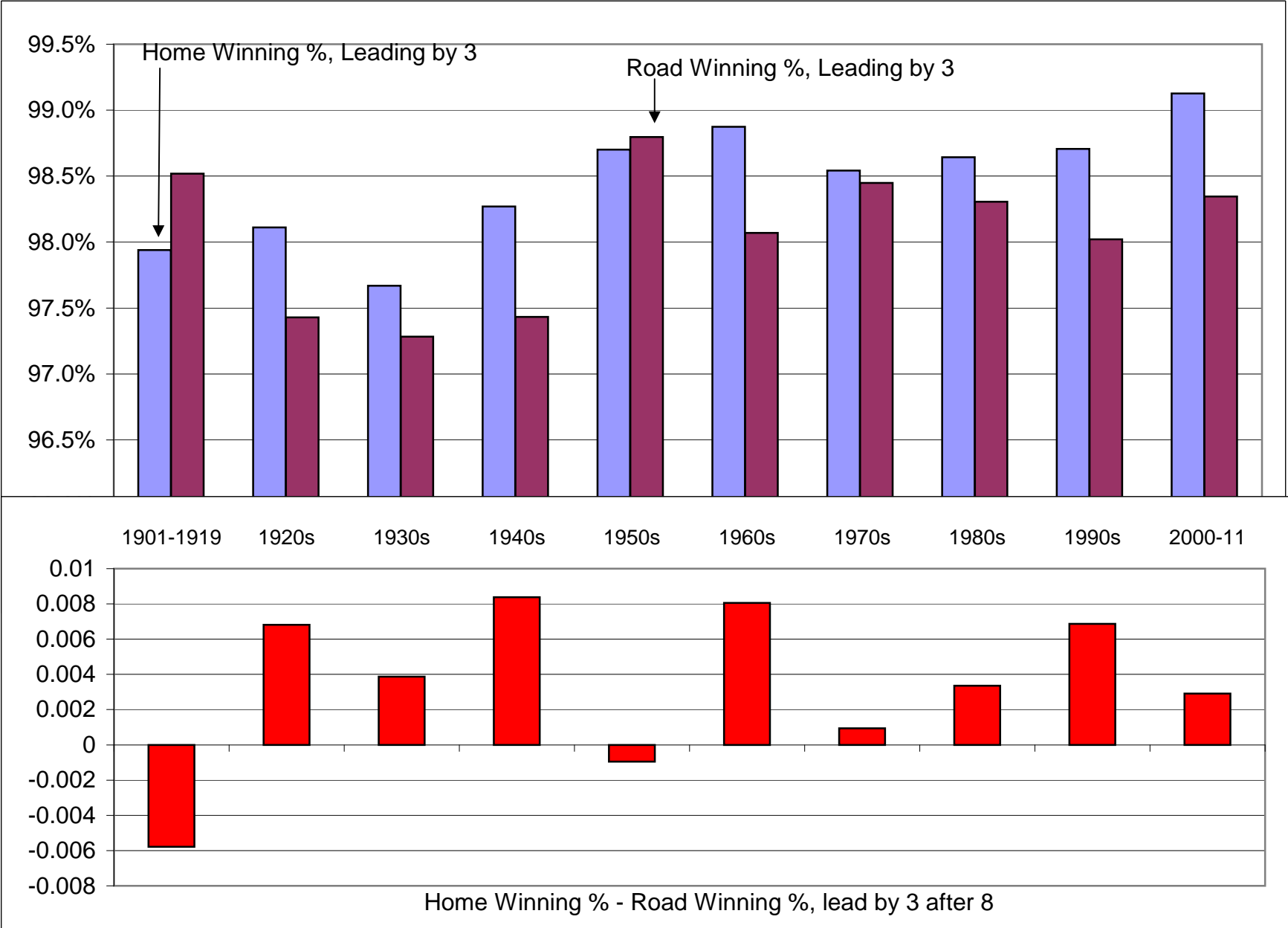
HOME TEAMS USUALLY WIN MORE OFTEN WHEN LEADING BY 1 AFTER 8 (in games that are over after 9 innings)



HOME TEAMS USUALLY WIN MORE OFTEN WHEN LEADING BY 2 AFTER 8 (in games that are over after 9 innings)



HOME TEAMS USUALLY WIN MORE OFTEN WHEN LEADING BY 3 AFTER 8 (in games that are over after 9 innings)



PRIOR GRAPHS SHOW THAT HOME TEAM WIN MORE THAN THE LOSE IN "EXTRA INNING" AND CLOSE AFTER 8 GAMES

- These are the games where batting last can make a difference
- Accounts for a relatively small portion of home teams' advantage
- What accounts for the bulk of the advantage?
- Can we estimate the advantage due to batting last?
 - ▶ Look at distribution of close and not close games
 - ▶ Apply winning percentages to determine home wins - losses

EXAMPLE FIRST STEP: 2000-11 DATA

		Percent of games	Home Win %	Road Win %	
Close games	Extra Innings	12.7%	53.3%	46.7%	
	Home ahead by 1 after 8	8.8%	91.3%	8.7%	Home teams are more often ahead by 1, 2, 3 runs and win a higher percent of them
	Home behind by 1 after 8	8.3%	10.0%	90.0%	
	Home ahead by 2 after 8	8.6%	96.6%	3.4%	
	Home behind by 2 after 8	7.9%	4.4%	95.6%	
	Home ahead by 3 after 8	7.5%	99.1%	0.9%	
	Home behind by 3 after 8	6.4%	1.7%	98.3%	
Other games	39.9%	56.3%	43.7%	Large home +/-	

Notes:

- Games tied after 8 are in extra innings
- 1, 2, 3 run difference games are all nine inning games
- Other games: 4 or more runs difference after 8 and shorter games
- Tie games are not included

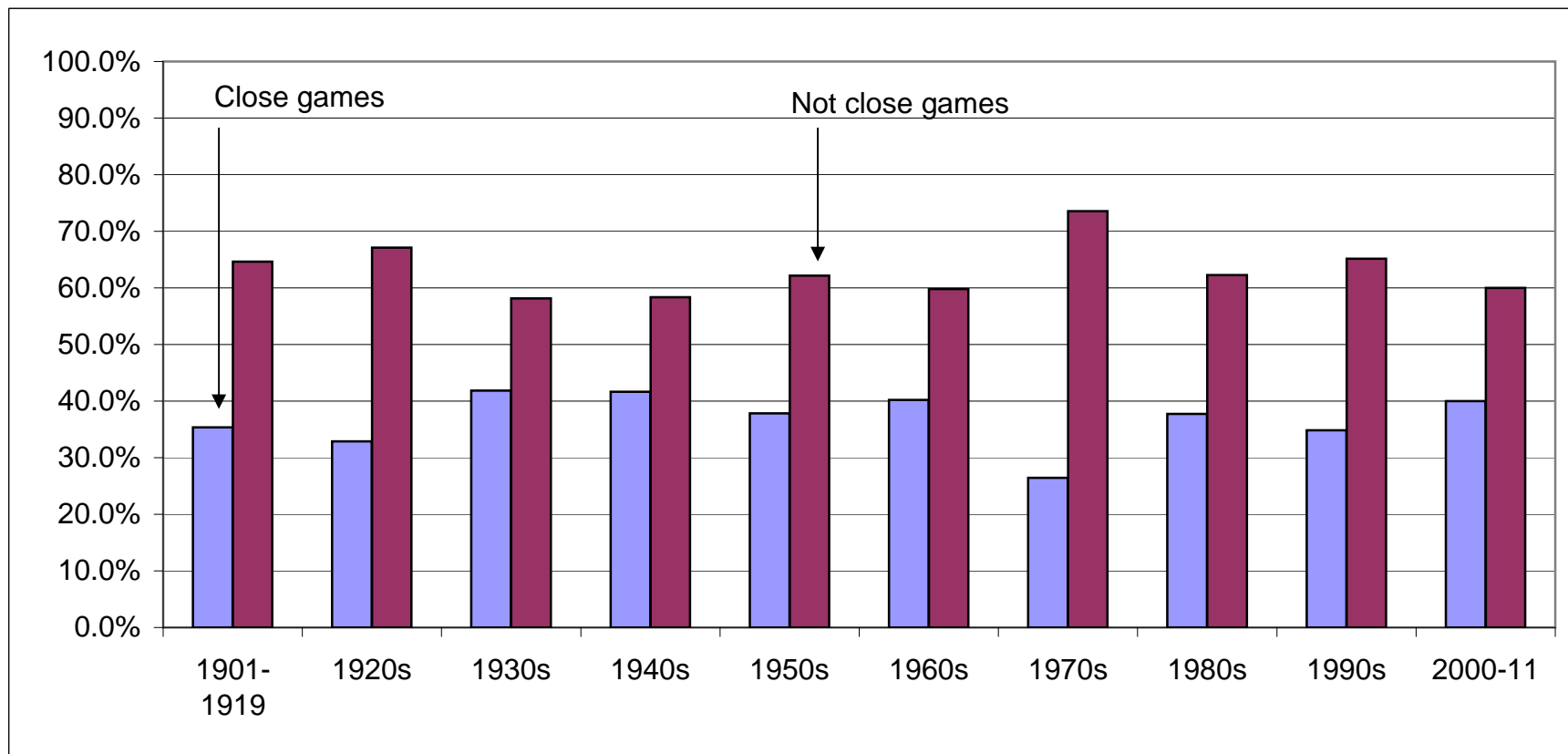
CALCULATION OF CONTRIBUTION TO HOME WINS MINUS LOSSES: 2000-11 DATA

	Home Wins	Road Wins	Home - Road	by type	% of total	
Extra Innings	1971	1728	243	243	9.9%	Close games provide about 40% of home teams' wins over losses
Home ahead by 1 after 8	2339	222	2117	182	7.4%	
Home behind by 1 after 8	241	2176	-1935			
Home ahead by 2 after 8	2410	84	2326	233	9.5%	
Home behind by 2 after 8	101	2194	-2093			
Home ahead by 3 after 8	2156	19	2137	326	13.3%	
Home behind by 3 after 8	31	1842	-1811			
Other games	6553	5078	1475	1475	60.0%	
Total	15802	13343	2459	2459	100.0%	

Graph on next page shows this split (40% from close games, 60% from others) by decade

PERCENT OF HOME WINS - LOSSES BY CLOSE OR NOT CLOSE GAMES

Close: extra innings or difference of most 3 runs after 8 innings



We see the advantage from batting last exists, but is not the largest part of home teams' advantage

Can we quantify the benefit from batting last?

- Realized in games that are won in the home teams' last time at bat (walk-off wins)
- Otherwise batting last was in losing game or there was no need to bat last

Two categories of walk-off wins

- Games tied after 8 or 9 innings: "extra inning" games
- Games not tied after 8 that the home team wins in the bottom of the ninth

CALCULATIONS USING 2000-2011 DATA

"Extra Inning" Games

- Home teams win 1971, lose 1728, a gain of 243 more wins than losses
- There were 29145 W + L, so this gain was 0.8% of all the games played

Walk-off win in other games

- There were 607
- Coming from behind after 8 or road team to ties or goes ahead in the top of the ninth
- What percentage would home teams have won if they had not won when they did?
- Two answers in evaluation
 - ▶ Would have lost them all, leads to a high estimate of value of batting last
 - ▶ Would have won these at the same percentage that home teams won all games

Add 0.8% from extra inning games to advantage gained in walk-off wins

- If assume home teams would have lost all, $607/29145 = 2.1\%$, so **2.9%** total
- With average win %, $607 * 45.8\% = 278$ more losses, $0.8\% + 1.0\% = 1.8\%$

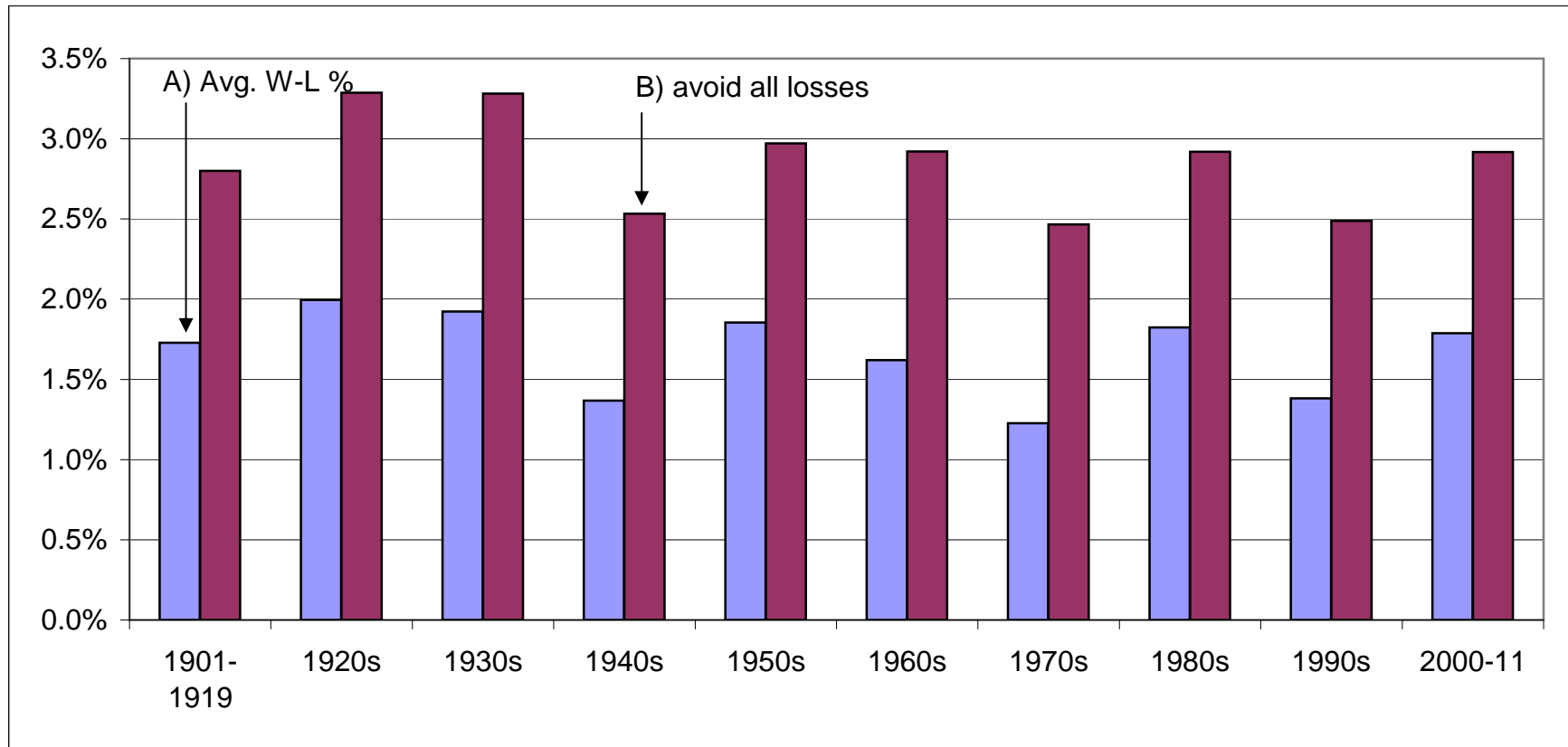
These estimates include other factors that are part of the home teams' advantages

ADVANTAGE OF BATTING LAST: ADDITIONAL WINNING PERCENTAGE

Based on "walk-off" wins (won in bottom of 9th or extra innings)

Losses "avoided" in games not tied after 8 or 9 based on

A) average home W-L %, B) losing all of walk-off wins



No striking trends over time (although was a little higher in the high scoring 20s & 30s)

1901-2011 average additional winning percentage:

- A) avoids losing at overall home winning percentage: 1.7% (.017)
- B) avoids losing all non-"extra inning" walk-off games: 2.9% (.029)

Special case: 1894

Until 1950, home team had the option to bat first

- Rarely used in the "modern" era (since 1901)
- Last known games were in 1913
- 1901-19 data in analysis adjusted for known games (18 out of 11,003)

Fairly common in 19th C.

- Wanted to bat first using a new ball
- Pitching mound moved back to 60' 6" for 1893, so current playing rules start then
- Only year in 1893-1900 with needed Retrosheet data is 1894

DATA FOR 1894 (NL was only major league)

Average runs per team per 9 innings: 7.5 (much more than current play)

Home Teams

- Batted first in 40.5% of games
- Won 61.0% of all games, excluding ties (more than current levels)
- Won 60.7% of games when batting first
- Won 61.2% of games when batting last

Team batting last won 52.3% of games played to a decision (slightly less than current levels)

"Extra inning" games (tied after 8 or 9 innings)

- Team batting last won 57.4% (35/61)
- Home team won 52.5% (32/61)
- Home team batting first won 45.2% (14/31)
- Home team batting last won 60.0% (18/30)

WHAT HAVE WE FOUND OUT?

1) Batting Last is an advantage, but accounts for less than half of home team's edge

- Average home winning percentage 1901-2011 (games in database): **54.2%**
(missing about half of 1901-1919 games)
- Average edge from "walk off" wins: **1.7%**
 - ▶ Only games for which batting last has a direct effect
 - ▶ Example: 0.500 if "neutral" becomes 0.517 with batting last advantage
 - ▶ Some other home team advantage factors are included in the 1.7%
 - ▶ So 1.7% overestimates the advantage from batting last
 - ▶ Home advantage is 4.2%, so batting last is well under half of it

2) In 1894, being at home was much more important than batting last

- Home teams won about 61% whether batting first (40.5% of games) or last
- Home team advantage much greater than during modern (since 1901) play
- Data then support to an even greater extent that batting last is only a small part of the home team's advantage

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- Will be posted on Retrosheet.org research papers page:
<http://www.retrosheet.org/Research/Research.htm>
- Send me an e-mail: "sabr@pankin.com"