USING PLAYER QUALITY AND INJURY PROFILES TO SIMULATE RESULTS IN AUSTRALIAN FOOTBALL

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Champion Data
(Melbourne, Australia)

A Modern-Day Epic

A Modern-Day Epic

2016 AFL Premiers – Western Bulldogs

No premiership since 1954

Captain injured in Round 3 (of 23)

Late season injuries to:
- #5 Midfielder   (Round 18)
- #2 Midfielder   (Round 19)
- #3 Midfielder   (Round 19)
- #1 Defender   (Round 22)

Lost final regular season game to 16th (of 18) placed Fremantle (in Perth)
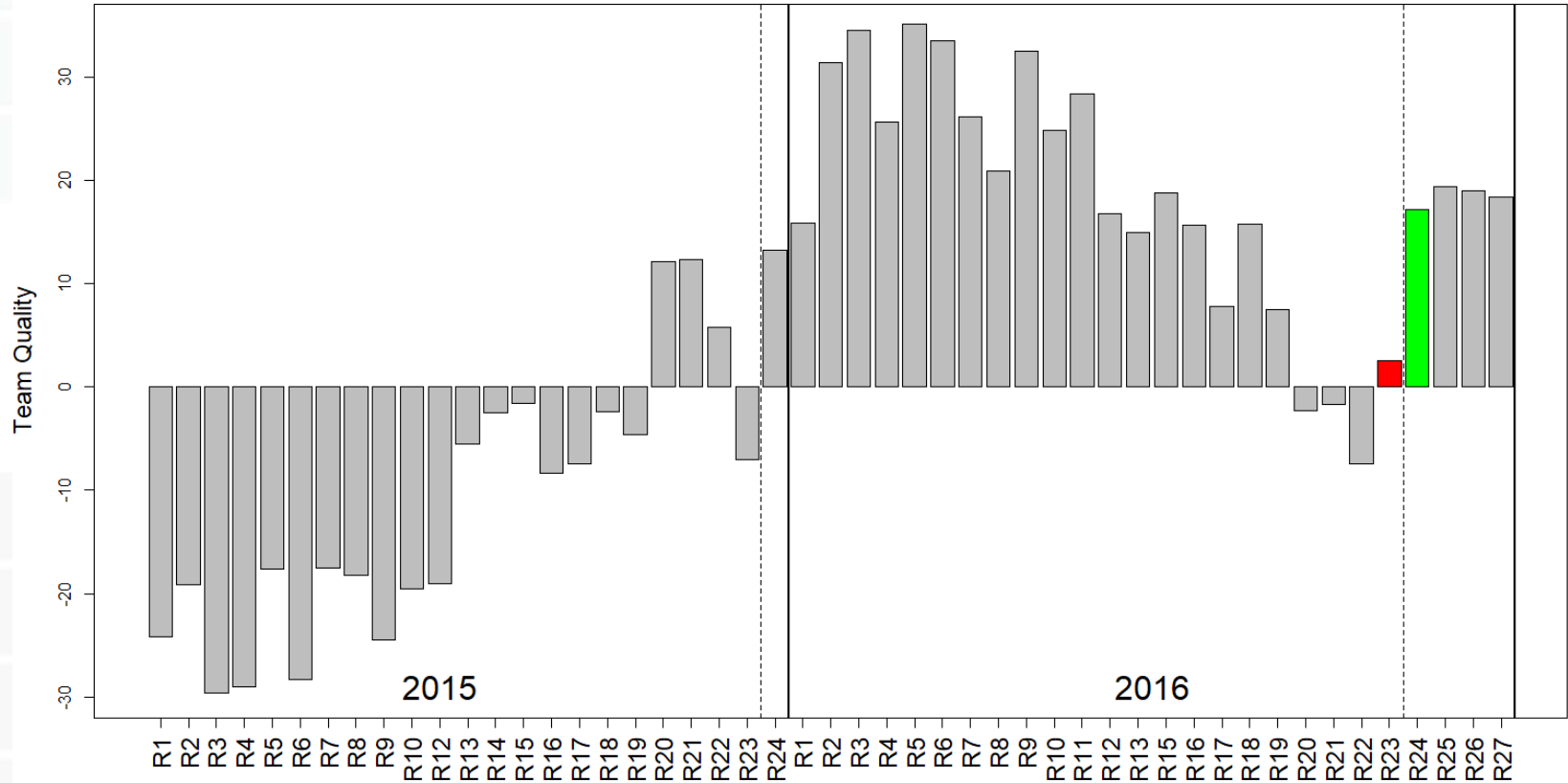
Bookmaker odds of $67 to win, with just eight teams remaining.

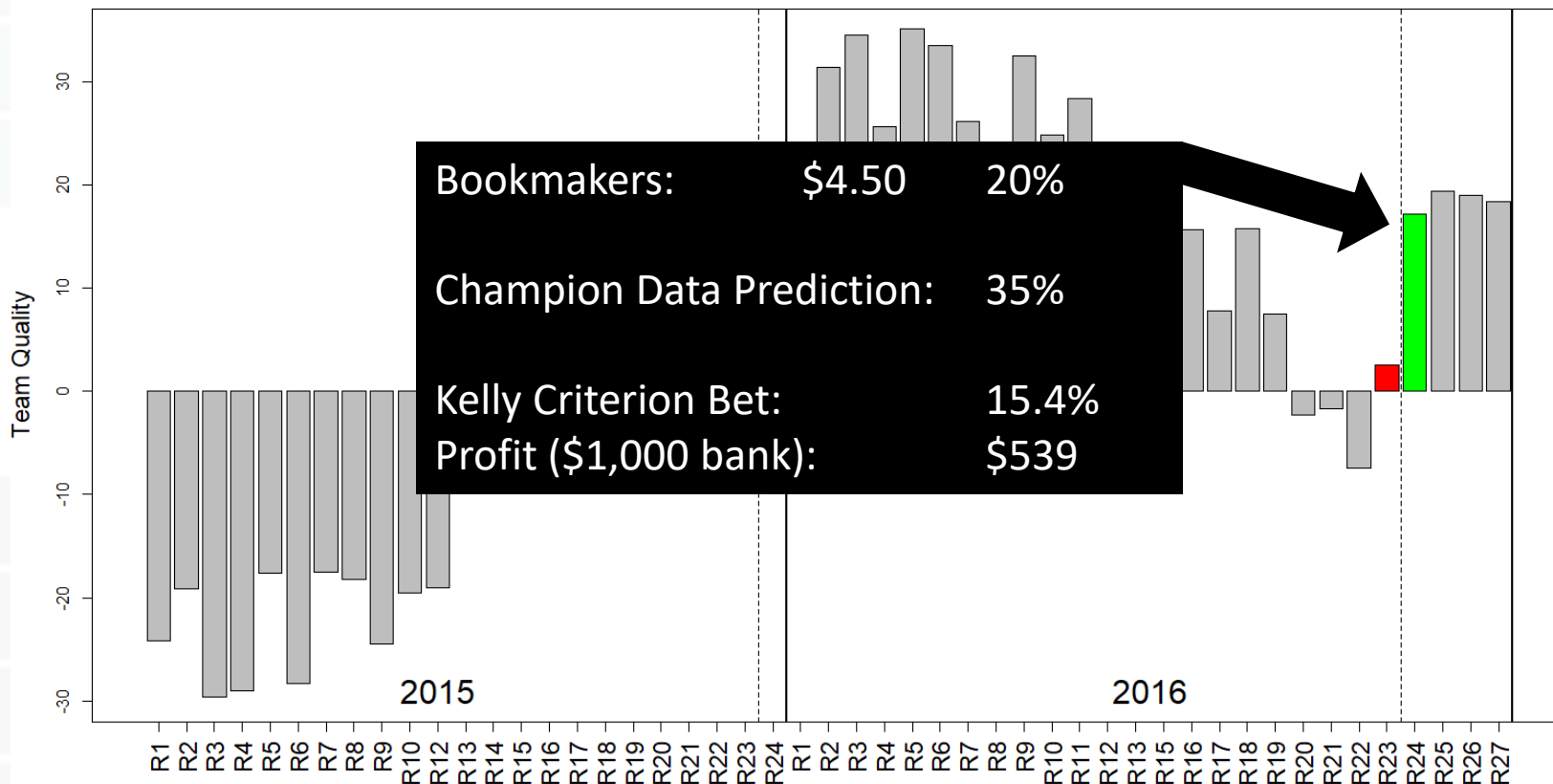Four elimination playoffs on the road
- Game 1 (Perth) $4.50 (20%)   99-52   (+47)
- Game 2 (Melbourne) $2.50 (35%)   107-84   (+23)
- Game 3 (Sydney) $2.95 (30%)   89-83   (+6)
- Game 4 (Melbourne) $2.45 (35%)   89-67   (+22)

********   TAB MULTI (5 legs)   ********

Leicester City $2001.00
2016 English Premier League
Western Bulldogs $17.00
2016 AFL Premiership
Cleveland Cavaliers $4.00
2015/16 NBA Championship
Cronulla Sharks $13.00
2016 NRL Premiership
Chicago Cubs $15.00
2016 World Series Champions

Value   Cost
$1.00   PRICE $26,533,260.00
             RETURN $26,533,260.00 $1.00

THIS IS NOT A REAL TICKET.
BUT COULD YOU IMAGINE...

TAB Limited

Western Bulldogs Team Quality (2015-2016)

Western Bulldogs Team Quality (2015-2016)

Bookmakers: $4.50 20%

Champion Data Prediction: 35%

Kelly Criterion Bet: 15.4%
Profit ($1,000 bank): $539

Prediction Model

logit(Home Win %) =   0.124 x Home
  + 0.380 x Opposition Travel
  + 0.040 x Difference in Team Quality

Home   = Home Team
Opposition Travel = Away Team not local
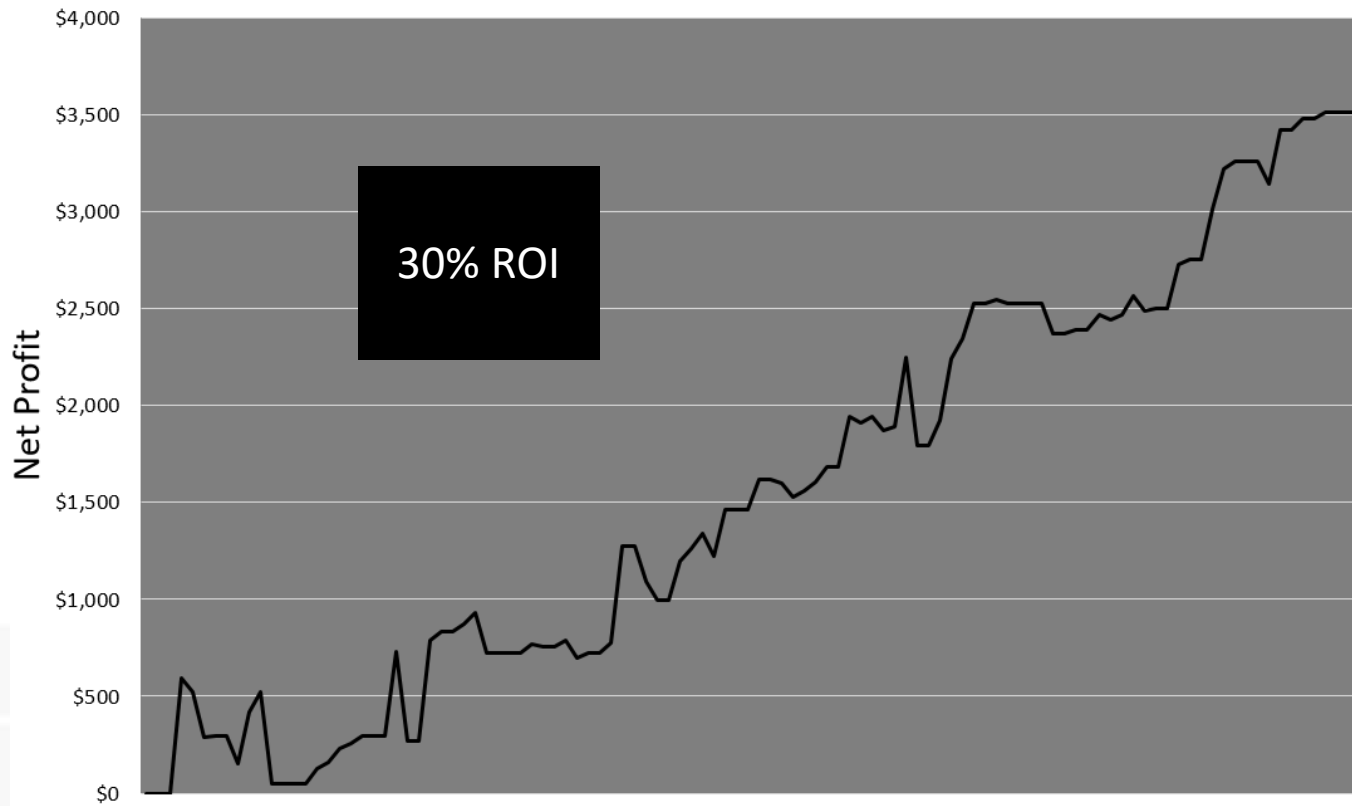Team Quality = Sum of quality of selected 22 players
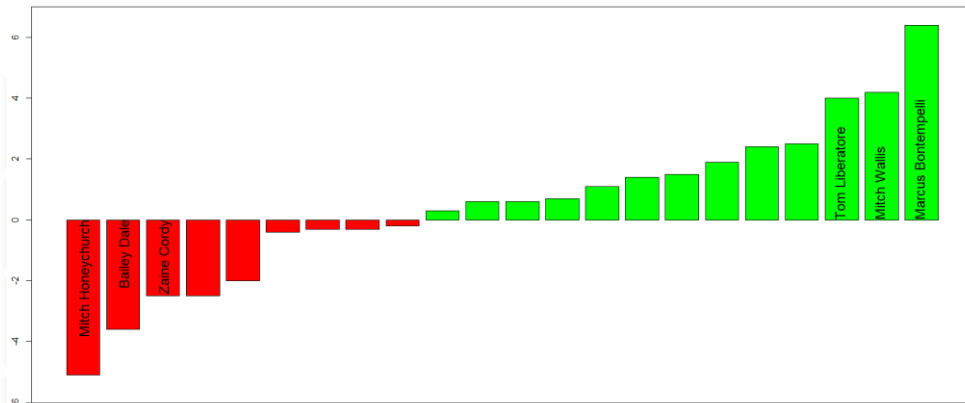
Western Bulldogs R13 2017

Team Quality =

+27.6 (13 Players)
- 16.9 (9 Players)

= +10.7
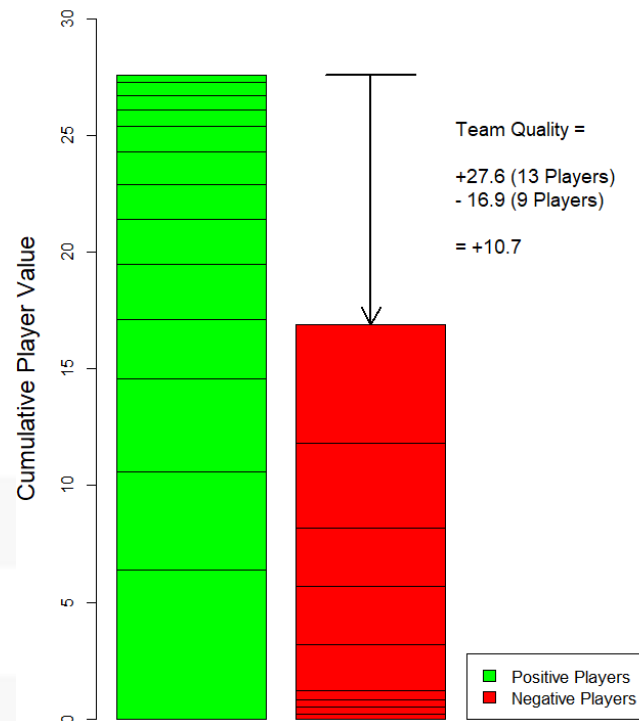
Prediction Model

Hypothetical Profit/Loss - 2017 AFL Season
($1,000 starting bank)

30% ROI

2017 Season Simulation

198 Matches

Each team has "best possible" team available

Simulate matches based on prediction model.

% of Simulations in Ladder Position:

| Ladder Pos:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
GWS	46	21	13	8	5	3	2	1	1	0	0	0	*	*	*	*	*	*
WB	15	18	16	13	11	9	7	5	3	2	1	1	0	0	0	*	*	*
WCE	11	15	15	14	12	10	8	6	4	3	2	1	1	0	0	*	*	*
HAW	8	13	13	13	12	10	9	7	6	4	3	2	1	1	0	0	*	*
SYD	7	11	12	13	12	11	10	8	6	4	3	2	1	1	0	0	*	*
ADEL	5	8	10	11	11	11	10	9	7	6	4	3	2	1	1	0	*	*
PA	4	8	10	11	12	12	11	10	8	6	4	3	2	1	1	0	*	*
GEE	1	3	4	6	7	9	10	11	11	10	8	7	5	4	2	1	0	*
COLL	1	3	4	6	8	9	10	11	11	10	9	7	5	4	2	1	0	*
MELB	0	1	1	2	3	5	6	8	10	11	11	11	10	9	7	4	1	0
RICH	0	0	1	1	2	4	5	7	9	10	11	12	12	10	8	5	2	0
FREM	0	0	1	1	2	3	5	6	8	10	11	12	12	11	9	6	2	0
GC	*	0	0	1	1	2	3	5	7	9	11	12	13	13	11	8	3	1
SK	*	0	0	1	1	2	3	4	6	8	9	11	13	14	14	11	4	1
ESS	*	0	0	0	1	1	2	3	4	6	8	10	12	15	17	14	7	2
NM	*	*	*	0	0	0	1	1	2	3	4	6	8	12	17	25	16	5
CAR	*	*	*	*	*	*	*	0	0	0	1	1	2	4	9	19	41	22
BL	*	*	*	*	*	*	*	*	*	*	*	0	0	1	2	6	22	69

Injury Prevalence/Duration

Injury Prevalence

2013 – 2016 AFL Players:

68,219 player weeks (non-injured players)
3,758 new injuries

≈ One injury every 18 available matches
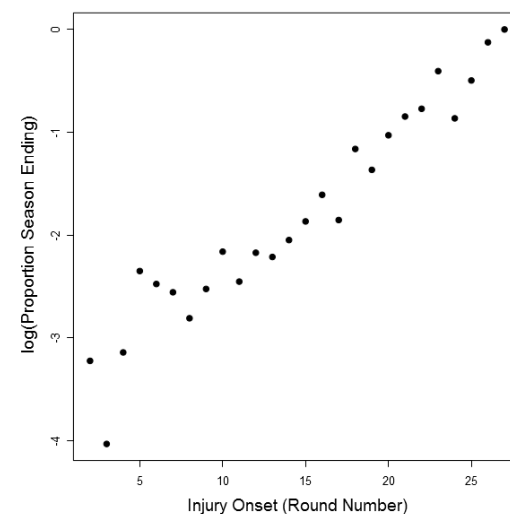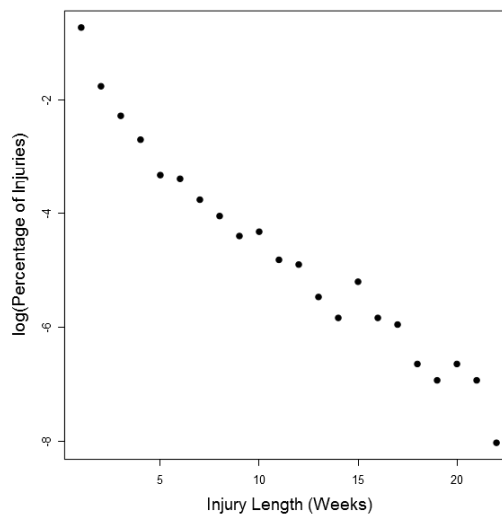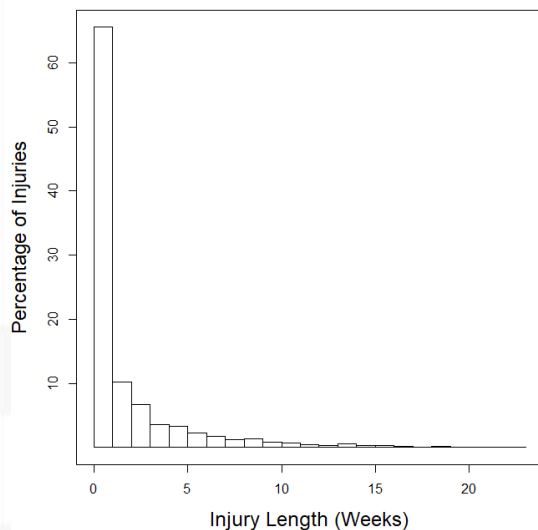
Player Improvement/Decline

Player Improvement/Decline
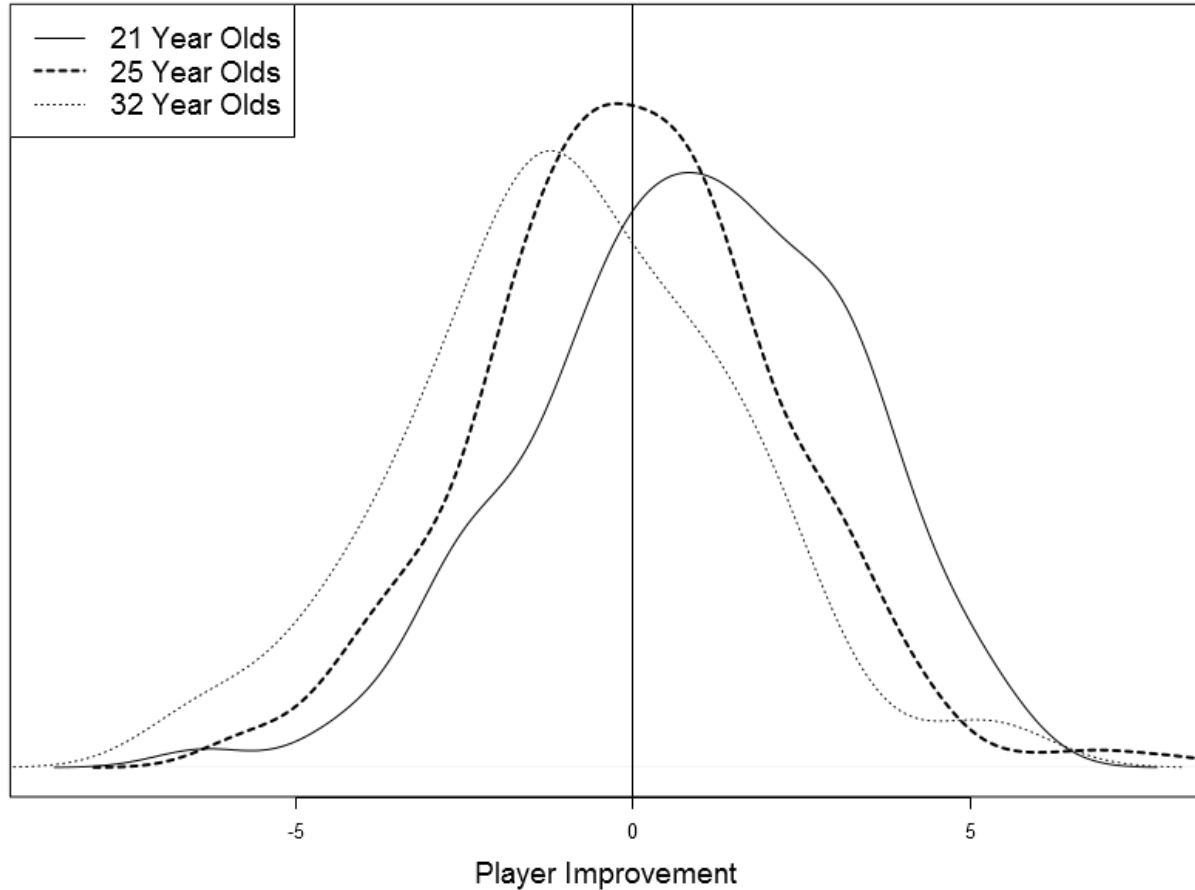
2017 Season Simulation (Updated)

198 Matches

For each simulation:
- Random improvement/decline of every player (based on age of player)
- Random injuries to players at a rate of 1/18 for players not already injured
  - Random Bernoulli trial to determine whether injury is season-ending (based on round of injury)
  - Random injury length if not season-ending

Team selection then based on best available players.

Simulate matches based on prediction model.

2017 Season Simulation (Updated)

198 Matches

For each sin
- Random
- Random
  - R ...und of injury)
  - R

Team select

Simulate ma

Ladder Position:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
GWS	28	18	13	10	8	6	5	4	3	2	1	1	1	0	0	0	0	*
WB	21	17	14	11	9	7	6	5	3	2	2	1	1	0	0	0	0	0
SYD	12	13	12	11	10	9	7	7	5	4	3	3	2	1	1	0	0	0
WCE	11	12	12	10	9	8	8	7	5	5	4	3	2	2	1	1	0	0
PA	6	9	10	10	10	10	9	8	6	6	5	4	3	2	1	1	0	0
ADEL	6	8	9	9	9	9	8	8	8	6	5	5	4	3	2	1	1	0
HAW	4	6	8	8	8	8	9	8	8	7	6	6	5	3	3	1	1	0
COLL	3	5	6	7	8	9	8	8	8	8	7	6	6	4	3	2	1	0
GEE	3	4	5	7	7	7	9	8	8	8	7	7	6	6	4	3	1	0
MELB	2	3	4	5	6	7	7	8	8	9	9	8	8	6	5	3	2	1
RICH	1	2	2	3	4	4	5	7	8	8	9	10	9	10	8	6	4	2
FREM	1	1	2	3	3	4	5	6	7	9	9	9	10	10	9	7	4	1
SK	0	1	2	2	3	5	5	6	7	8	9	9	10	10	9	7	4	1
GC	0	1	1	2	3	4	5	6	7	8	9	10	10	10	9	7	4	2
ESS	0	0	1	1	1	2	3	3	4	6	8	9	10	12	13	12	9	5
NM	0	0	0	0	1	1	1	2	2	3	4	6	8	11	14	19	17	11
CAR	*	0	0	0	0	0	0	1	1	1	2	3	4	7	12	17	28	23
BL	*	*	0	*	0	0	0	0	0	0	0	1	1	2	5	11	25	54

2017 In-Season Simulation

Simulate Remaining Matches

Use official injury lists to determine player availability

For each simulation:
- Random improvement/decline of every player (based on age of player)
  - Less impact than pre-season model as players have played more games this season.
- Random injuries to players at a rate of 1/18 for players not already injured
  - Random Bernoulli trial to determine whether injury is season-ending (based on round of injury)
  - Random injury length if not season-ending

Team selection then based on best available players.

Simulate matches based on prediction model.

2017 In-Season Simulation

At the conclusion of Round 14 (yesterday)

9 matches per team remaining.

Current	Order	Club	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Two	Four	Eight	Ave	Odds	Bet
1	1	GWS Giants	50%	24%	12%	7%	4%	2%	<1%	<1%	<1%	<1%	<1%	<1%	<1%						74%	93%	>99%	2.0	-	
2	2	Adelaide Crows	26%	28%	18%	11%	7%	4%	2%	1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%				54%	84%	99%	2.8	-	
4	3	Port Adelaide	10%	19%	22%	16%	12%	8%	6%	4%	2%	1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%		29%	67%	96%	3.9	1.05	9%
3	4	Geelong Cats	9%	13%	18%	18%	14%	10%	7%	5%	3%	2%	<1%	<1%	<1%	<1%	<1%	<1%			22%	58%	94%	4.4	1.01	
5	5	Melbourne	3%	7%	12%	15%	17%	14%	11%	8%	6%	4%	2%	1%	<1%	<1%	<1%	<1%			10%	37%	87%	5.5	1.16	8%
6	6	Richmond	1%	3%	7%	10%	12%	14%	14%	12%	10%	7%	5%	3%	1%	<1%	<1%	<1%	<1%		4%	20%	73%	6.9	1.25	
9	7	Western Bulldogs	<1%	3%	6%	9%	12%	14%	14%	12%	11%	8%	5%	3%	2%	<1%	<1%	<1%	<1%		3%	18%	70%	7.1	1.48	7%
10	8	Sydney Swans	<1%	<1%	3%	6%	9%	12%	14%	15%	14%	11%	7%	5%	3%	2%	<1%	<1%	<1%		1%	10%	59%	8.0	1.95	15%
7	9	West Coast Eagles	<1%	1%	3%	5%	8%	11%	13%	14%	14%	12%	9%	6%	3%	1%	<1%	<1%	<1%	<1%	1%	9%	55%	8.1	1.57	
8	10	St Kilda	<1%	<1%	<1%	2%	3%	5%	6%	9%	11%	14%	15%	14%	10%	6%	3%	1%	<1%	<1%	<1%	2%	25%	10.3	3.00	
11	11	Essendon	<1%	<1%	<1%	<1%	2%	4%	6%	9%	12%	15%	15%	13%	10%	7%	4%	2%	<1%	<1%	<1%	1%	22%	10.5	2.25	
13	12	Collingwood		<1%	<1%	<1%	<1%	2%	3%	5%	8%	11%	13%	15%	14%	12%	9%	6%	3%	<1%	<1%	<1%	11%	11.9	9.00	
14	13	Gold Coast Suns		<1%	<1%	<1%	<1%	<1%	1%	2%	4%	7%	11%	15%	17%	16%	13%	8%	4%	<1%	<1%	<1%	5%	12.8	26.00	1%
12	14	Fremantle			<1%	<1%	<1%	<1%	<1%	2%	3%	4%	7%	10%	14%	17%	18%	14%	10%	<1%		<1%	3%	13.7	6.00	
16	15	Hawthorn			<1%	<1%	<1%	<1%	<1%	<1%	2%	3%	5%	9%	13%	16%	18%	17%	15%	<1%		<1%	2%	14.2	10.00	
15	16	Carlton			<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	1%	3%	6%	10%	16%	26%	34%	3%		<1%	<1%	15.6	26.00	
17	17	North Melbourne				<1%	<1%	<1%	<1%	<1%	1%	3%	4%	8%	11%	17%	24%	29%	3%			<1%		15.3	26.00	
18	18	Brisbane Lions									<1%	<1%	<1%	<1%	<1%	1%	5%	93%						17.9	-	

Current Ladder Position | Most Likely Finish | Probable Range