Fully worked out Logan Webb fWAR calculation

completed 8/22/24

Year

2023

MLB ERA	MLB HR	MLB BB	MLB HBP	MLB K	MLB IFFB	MLB IP	MLB RA9
4.33	5868	15819	2112	41843	4542	43087.33	4.69

NL HR	NL BB	NL HBP	NL K	NL IFFB	NL IP
2933	7975	1049	20515	2230	21,509.67

P HR	P BB	P HBP	P K	P IFFB	P IP	P G	P GS	P PF	P gmLI
20	31	5	194	9	216	33	33	96	0.87

only necessary for relief pitchers

1) ifFIP Constant

* ifFIP Constant = MLB ERA − ((13 · MLB HR) + (3 · (MLB BB + MLB HBP)) − (2 · (MLB K + MLB IFFB))) / MLB IP

= 4.33 − ((13 · 5868) + (3 · (15819 + 2112)) − (2 · (41843 + 4542))) / 43087.33

= 3.464153882

2) ifFIP

* ifFIP = ((13 · HR) + (3 · (BB + HBP)) − (2 · (K + IFFB))) / IP + ifFIP Constant

= ((13 · 20) + (3(31 + 5)) − (2(194 + 9))) / 216 + 3.464153882

= 3.288227956

3) FIP R9

* FIPR9 = ifFIP + (MLB RA9 − MLB ERA)

= 3.288227956 + (4.69 − 4.33)

= 3.648227956

4) pFIPR9

* pFIPR9 = FIPR9 / (PF / 100)

= 3.648227956 / (96 / 100)

= 3.800237454

= MLB Stat

= NL Stat

= Webb Stat

= Stat/Value we have calculated

5) NL ifFIP

* NL ifFIP = ((13 · NL HR) + (3(NL BB + NL HBP)) − (2(NL K + NL IFFB)))/NL IP + ifFIP constant

= ((13 · 2933) + (3(7975 + 1049)) − (2(20515 + 2230)))/21509.667 + 3.464153882

= 4.38053255

6) NL FIPR9

* NL FIPR9 = NL ifFIP + (MLB RA9 − MLB ERA)

= 4.38053255 + (4.69 − 4.33)

= 4.74053255

* You can use either MLB RA9 & MLB ERA or NL RA9 & NL ERA, you will get the same value*

7) RAAP9

* RAAP9 = NL FIPR9 − pFIPR9

= 4.74053255 − 3.800237454

= 0.940295096

8) dRPW

* dRPW = ([([([(18 − IP/G) · (NL FIPR9)] + [(IP/G) · pFIPR9])/18] + 2) · 1.5

= ([([([(18 − 216/33) · (4.74053255)] + [(216/33) · 3.800237454])/18] + 2) · 1.5

= 9.597910591

9) WPGAA

* WPGAA = RAAP9/dRPW

= 0.940295096 / 9.597910591

= 0.097968725

10) Replacement Level

* Replacement Level = $0.03 \cdot (1 - GS/G) + 0.12 \cdot (GS/G)$

$= 0.03 \cdot (1 - 33/33) + 0.12 \cdot (33/33)$

$= 0.12$

11) Scale to IP

* WPGAR = WPGAA + Replacement Level

$= 0.097968725 + 0.12$

$= 0.217968725$

12) Preliminary WAR

* pWAR = WPGAR $\cdot \left(\frac{IP}{9}\right)$

$= 0.217968725 \cdot \left(\frac{216}{9}\right)$

$= 5.2312494$

13) Leverage Adjustment

* Leverage Index Multiplier = $(1 + gmLI)/2$

The Fangraphs example says you Can ignore this step for Starting pitchers.

14) Final Adjustment

* WAR Correction = WARIP · IP
  * Recall that we do not know the exact WARIP value (because Fangraphs does not tell us or show us how to solve for it)

$-0.0012 \leq WARIP \leq -0.0007$

Through testing (shown in Demo video) I found -0.0007 yields the closest results to Fangraphs' site.

WAR Correction = $-0.0007 \cdot 216$

$= -0.1512$

15) Final WAR!

* WAR = pWAR + Correction

$= 5.2312494 + (-0.1512)$

$= 5.0800494$

Final WAR : 5.1 * Diff = 0.18*

FWAR (on-site) : 4.9