

Results

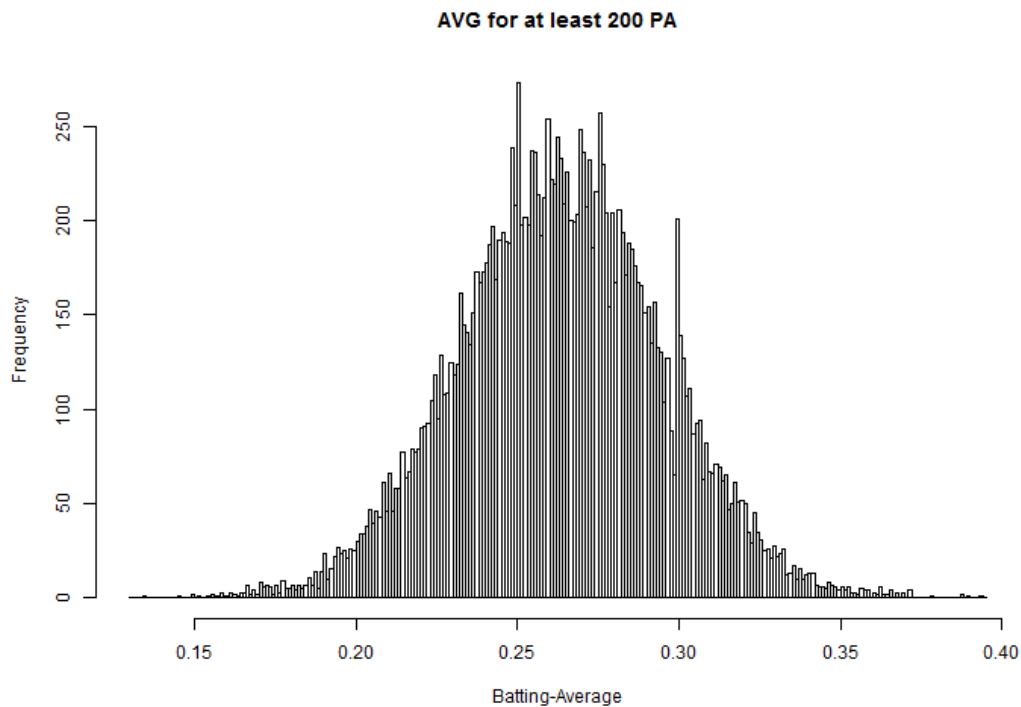
Reio.T

9/27/2018

Data = from 1957 to 2017 ($n = 53090$)

1 Full-sample analysis

- Batting-Average ($n = 17788$)



*difference between the number of batters with .299 (0.37%) and .300 (1.13%) is significant at 0.1% ($\chi^2 = 69.03$)

**Also, the difference between those with .299, .298 (0.87%) and with .300 and .301 (1.91%) is significant at 0.1% ($\chi^2 = 70.26$)

- Other Index for performance

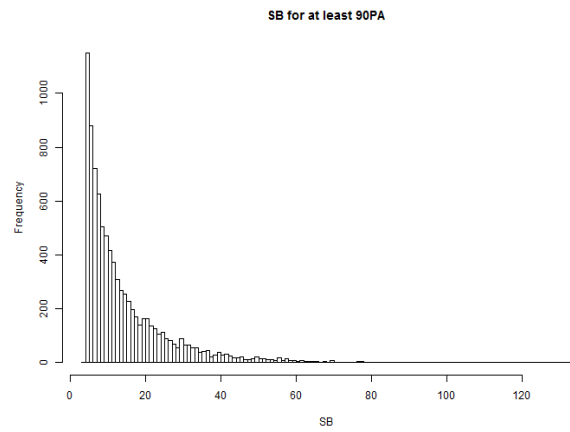
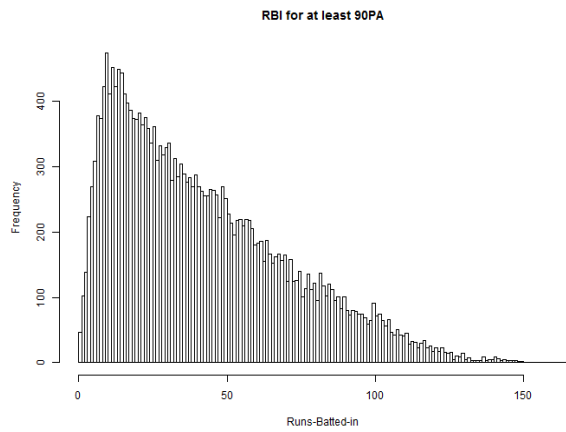
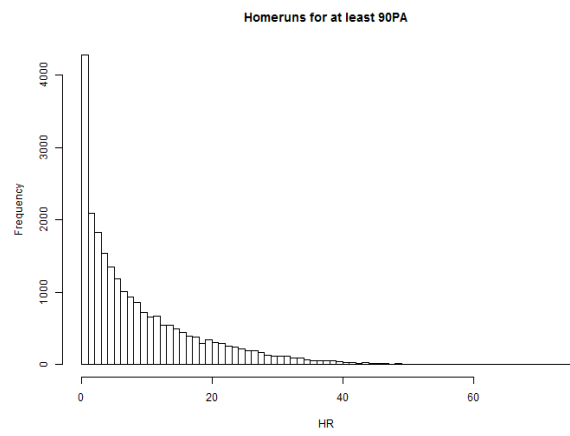
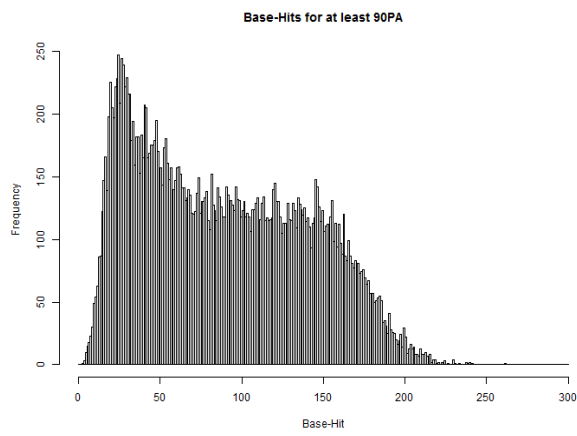
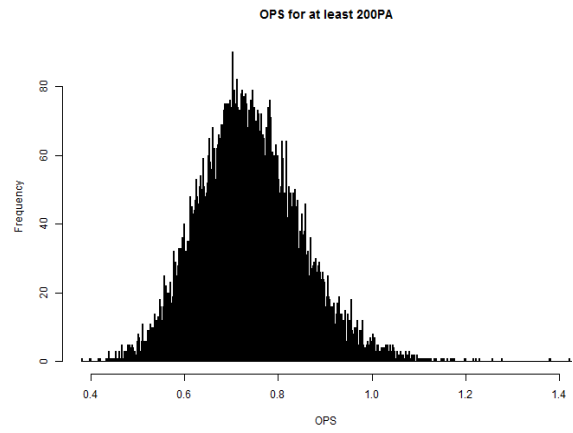
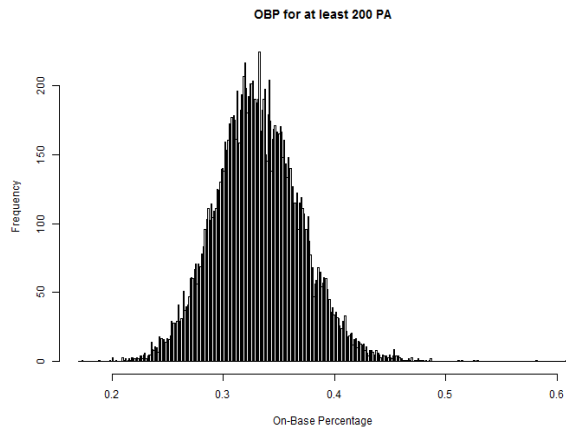


Table 1:

	<i>Dependent variable:</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
AVG	9.849*** (0.616)			Log-salary next season		
OBP		10.439*** (0.453)				
OPS			4.999*** (0.162)			
wOBA				11.610*** (0.423)		
BATTING					0.031*** (0.001)	
fWAR						0.272*** (0.009)
ABOVE_300	-0.842 (0.767)	-0.481 (0.438)	-0.207 (0.336)	-0.565 (0.409)	-0.070 (0.055)	0.043 (0.071)
FIELDING	0.003* (0.002)	0.005*** (0.002)	0.007*** (0.002)	0.006*** (0.002)	0.007*** (0.002)	
BaseRun	-0.021*** (0.005)	-0.022*** (0.005)	-0.014*** (0.005)	-0.017*** (0.005)	-0.017*** (0.005)	
AVG:ABOVE_300	3.058 (2.456)					
OBP:ABOVE_300		1.515 (1.164)				
OPS:ABOVE_300			0.165 (0.389)			
wOBA:ABOVE_300				1.483 (1.092)		
BATTING:ABOVE_300					0.001 (0.002)	
fWAR:ABOVE_300						-0.012 (0.018)
Constant	11.618*** (0.160)	10.750*** (0.149)	10.485*** (0.121)	10.417*** (0.137)	14.187*** (0.014)	13.778*** (0.019)
Observations	8,883	8,883	8,883	8,883	8,883	8,928
R ²	0.065	0.101	0.146	0.125	0.140	0.153
Adjusted R ²	0.064	0.100	0.146	0.125	0.140	0.153
Residual Std. Error	1.295 (df = 8877)	1.270 (df = 8877)	1.238 (df = 8877)	1.253 (df = 8877)	1.242 (df = 8877)	1.231 (df = 8924)
F Statistic	122.451*** (df = 5; 8877)	199.008*** (df = 5; 8877)	304.053*** (df = 5; 8877)	254.613*** (df = 5; 8877)	290.119*** (df = 5; 8877)	539.388*** (df = 3; 8924)

* p<0.1; ** p<0.05; *** p<0.01

Note:

Table 2:

	Dependent variable:					
	OLS			felm		
	(1)	(2)	(3)	(4)	(5)	(6)
	Log-salary next season					
fWAR	0.272*** (0.009)	0.281*** (0.008)	0.279*** (0.008)	0.102*** (0.010)	0.022* (0.012)	0.083*** (0.008)
ABOVE_300	0.043 (0.071)	-0.089 (0.062)	-0.102* (0.062)	-0.038 (0.072)	-0.156** (0.070)	-0.077* (0.045)
AGE		0.928*** (0.034)	0.932*** (0.034)			1.619*** (0.027)
AGE_sq		-0.013*** (0.001)	-0.013*** (0.001)			-0.024*** (0.0005)
WPA					15.549*** (1.530)	7.584*** (0.988)
nWPA					24.902*** (1.571)	20.865*** (1.018)
fWAR:ABOVE_300	-0.012 (0.018)	0.004 (0.015)	0.006 (0.015)	0.0003 (0.017)	0.031* (0.017)	0.001 (0.011)
Constant	13.778*** (0.019)	-1.664*** (0.498)				
Fixed effect			Team	Individual	Individual, Team	Team
Observations	- 8,928	- 8,928	8,928	8,928	8,928	8,928
R ²	0.153	0.358	0.366	0.484	0.521	0.802
Adjusted R ²	0.153	0.357	0.363	0.364	0.407	0.755
Residual Std. Error	1.231 (df = 8924)	1.073 (df = 8922)	1.068 (df = 8893)	1.067 (df = 7239)	1.030 (df = 7208)	0.663 (df = 7206)
F Statistic	539.388*** (df = 3; 8924)	993.022*** (df = 5; 8922)				

*p<0.1; **p<0.05; ***p<0.01

Note:

Table 3:

	Dependent variable:					
	OLS			felm		
	(1)	(2)	(3)	(4)	(5)	(6)
	Log-salary next season					
BATTING	0.031*** (0.001)	0.030*** (0.001)	0.030*** (0.001)	0.030*** (0.001)	0.013*** (0.002)	0.015*** (0.001)
ABOVE_300	-0.070 (0.055)	-0.112** (0.049)	-0.099** (0.049)	-0.108** (0.049)	-0.187*** (0.054)	-0.177*** (0.044)
FIELDING	0.007*** (0.002)	0.008*** (0.002)	0.008*** (0.002)	0.008*** (0.002)	-0.004** (0.002)	0.007*** (0.001)
BaseRun	-0.017*** (0.005)	0.007* (0.004)	0.001 (0.005)	0.002 (0.005)	-0.048*** (0.006)	-0.003 (0.004)
AGE		0.947*** (0.035)	0.971*** (0.035)	0.976*** (0.035)		1.008*** (0.032)
AGE_sq		-0.014*** (0.001)	-0.014*** (0.001)	-0.014*** (0.001)		-0.015*** (0.001)
WPA					10.820*** (1.629)	16.259*** (1.373)
nWPA					25.727*** (1.492)	44.336*** (0.982)
BATTING:ABOVE_300	0.001 (0.002)	0.002 (0.002)	0.002 (0.002)	0.001 (0.002)	0.003 (0.002)	0.006*** (0.002)
Constant	14.187*** (0.014)	-1.393*** (0.519)				
Fixed effect			Position	Position, Team	Individual, Position, Team	Position, Team
Observations	8,883	8,883	8,883	8,883	8,883	8,883
R ²	0.140	0.324	0.344	0.354	0.548	0.476
Adjusted R ²	0.140	0.324	0.343	0.350	0.439	0.473
Residual Std. Error	1.242 (df = 8877)	1.101 (df = 8875)	1.086 (df = 8863)	1.080 (df = 8834)	1.003 (df = 7151)	0.972 (df = 8832)
F Statistic	290.119*** (df = 5; 8877)	608.849*** (df = 7; 8875)				

* p<0.1; ** p<0.05; *** p<0.01

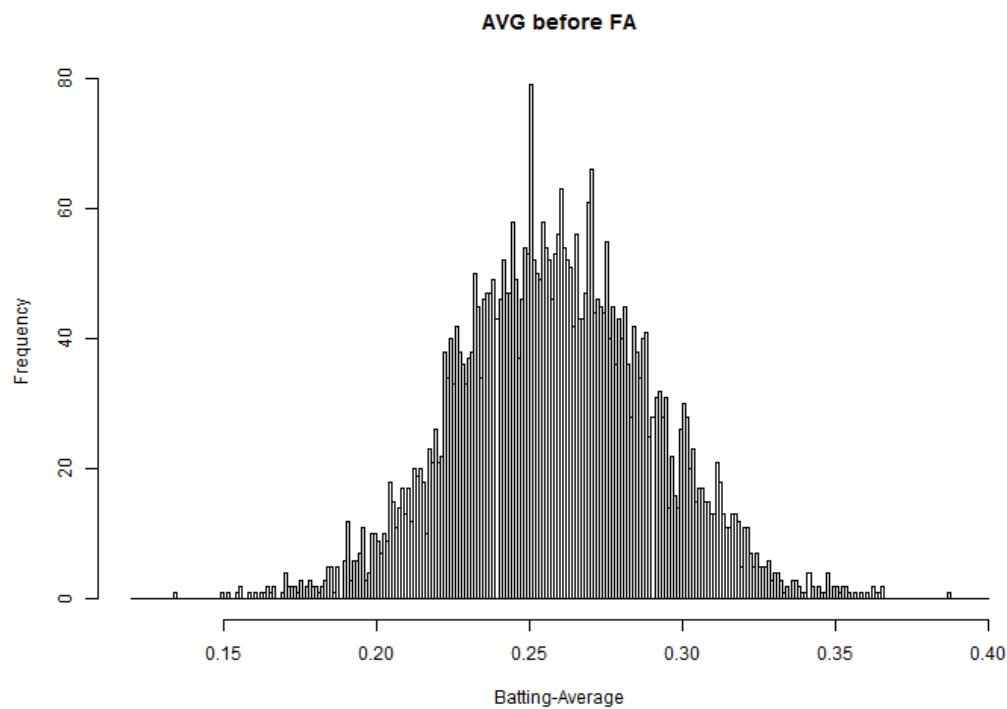
Note:

2 Restricted-sample analysis

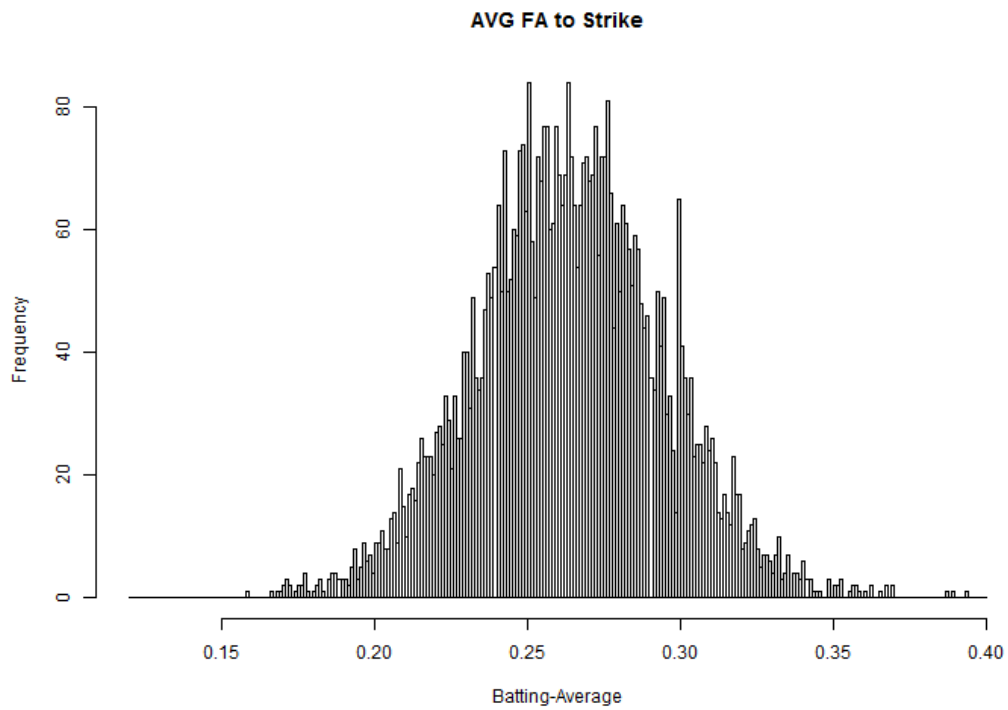
Behavior of the players may be influenced by the Season-specific effect.

Now I divide sample year into 4 era, according to three important events for the players' contract:

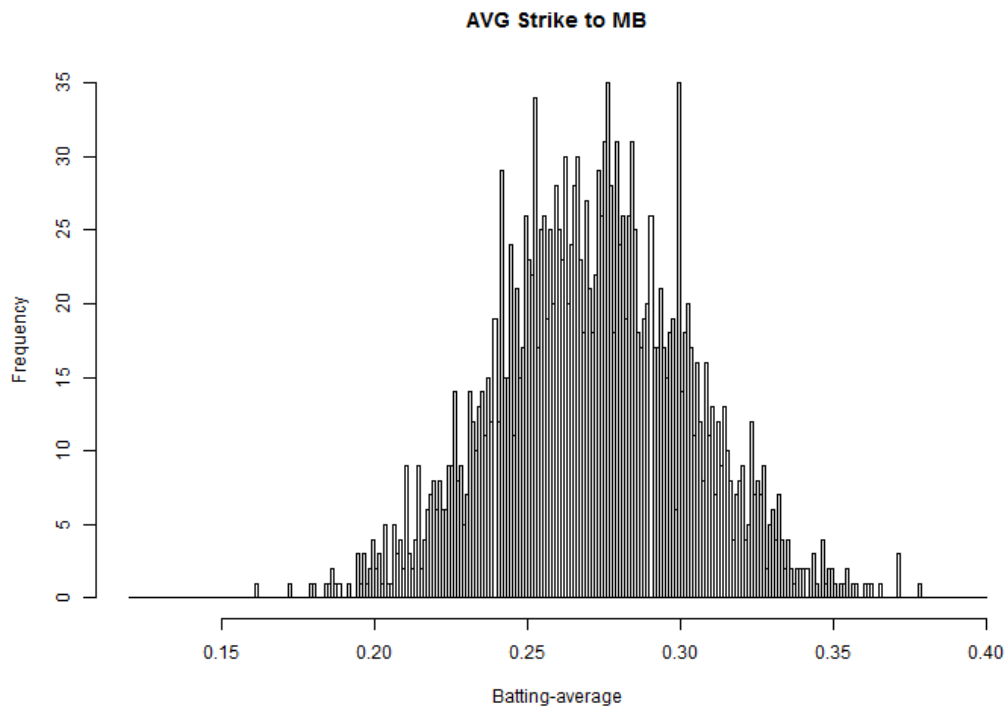
- Before "Free Agent" system was introduced: -1975 ($n = 4292$)
- Before "Strike" of the players occurred: 1976-1994 ($n = 5331$)
- Before 'Moneyball' was published: 1995-2001 ($n = 2028$)
- After 'Moneyball': 2002- ($n = 5555$)



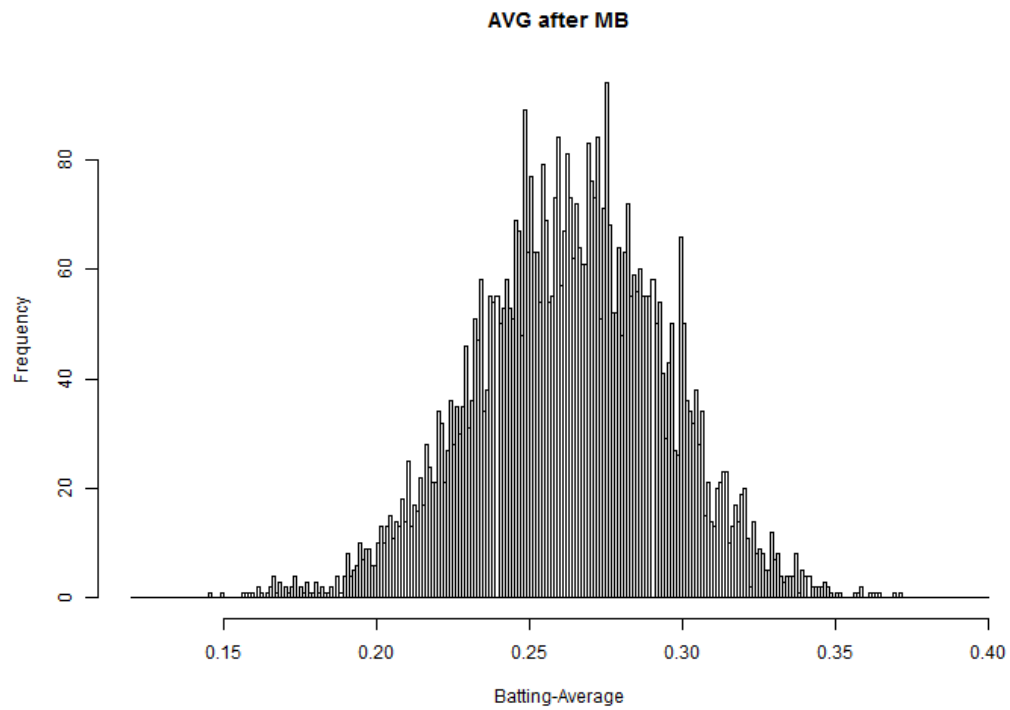
.299 to .300: significant at 5% ($\chi^2 = 3.04, p = 0.0406$)
.298, .299 to .300, .301: significant at 1% ($\chi^2 = 7.34, p = 0.0034$)



.299 to .300: significant at 0.1% ($\chi^2 = 31.88$)
 .298, .299 to .300, .301: significant at 0.1% ($\chi^2 = 31.60$)



.299 to .300: significant at 0.1% ($\chi^2 = 19.32$)
 .298, .299 to .300, .301: significant at 1% ($\chi^2 = 7.28, p = 0.0034$)



.299 to .300: significant at 0.1% ($\chi^2 = 16.67$)
.298, .299 to .300, .301: significant at 0.1% ($\chi^2 = 23.10$)

Table 4:

	Dependent variable:					
	OLS			felm		
	(1)	(2)	(3)	(4)	(5)	(6)
Log-salary next season						
fWAR	0.234*** (0.014)	0.234*** (0.012)	0.236*** (0.012)	0.080*** (0.017)	0.034* (0.019)	0.096*** (0.012)
ABOVE_300	0.154 (0.120)	0.013 (0.104)	-0.003 (0.104)	0.142 (0.131)	0.010 (0.129)	0.064 (0.077)
AGE		0.812*** (0.054)	0.811*** (0.054)			1.829*** (0.061)
AGE_sq		-0.012*** (0.001)	-0.012*** (0.001)			-0.027*** (0.001)
WPA					9.692*** (2.588)	4.835*** (1.551)
nWPA					25.105*** (2.723)	13.612*** (1.644)
fWAR:ABOVE_300	-0.007 (0.030)	0.015 (0.026)	0.017 (0.026)	0.024 (0.032)	0.048 (0.031)	-0.018 (0.018)
Constant	13.047*** (0.030)	-0.294 (0.790)				
Fixed effect			Team	Individual	Individual, Team	Team
Observations	-	2,122	2,122	2,122	2,122	2,122
R ²	0.189	0.401	0.416	0.533	0.583	0.851
Adjusted R ²	0.188	0.399	0.407	0.365	0.422	0.793
Residual Std. Error	0.959 (df = 2118)	0.825 (df = 2116)	0.820 (df = 2089)	0.849 (df = 1558)	0.810 (df = 1529)	0.485 (df = 1527)
F Statistic	165.009*** (df = 3; 2118)	282.841*** (df = 5; 2116)				

*p<0.1; **p<0.05; ***p<0.01

Note:

Table 5:

	Dependent variable:					
	OLS			Log-salary next season		
	(1)	(2)	(3)	(4)	(5)	(6)
BATTING	0.027*** (0.002)	0.026*** (0.002)	0.027*** (0.002)	0.028*** (0.002)	0.007** (0.003)	0.014*** (0.002)
ABOVE_300	0.037 (0.102)	-0.102 (0.089)	-0.112 (0.089)	-0.114 (0.089)	0.010 (0.107)	-0.135* (0.078)
FIELDING	0.006** (0.003)	0.005* (0.002)	0.004* (0.002)	0.005* (0.002)	0.003 (0.003)	0.005** (0.002)
BaseRun	0.044*** (0.013)	0.049*** (0.011)	0.044*** (0.012)	0.044*** (0.012)	-0.019 (0.017)	0.013 (0.011)
AGE		0.819*** (0.056)	0.825*** (0.056)	0.832*** (0.056)		0.915*** (0.050)
AGE_sq		-0.012*** (0.001)	-0.012*** (0.001)	-0.012*** (0.001)		-0.014*** (0.001)
WPA					8.579*** (2.801)	13.581*** (2.109)
nWPA					26.270*** (2.657)	37.854*** (1.519)
BATTING:ABOVE_300	0.001 (0.004)	0.006* (0.004)	0.006 (0.004)	0.005 (0.004)	0.006 (0.004)	0.008*** (0.003)
Constant	13.388*** (0.023)	0.004 (0.820)				
Fixed effect	-	-	Position	Position, Team	Individual, Position, Team	Position, Team
Observations	2,108	2,108	2,108	2,108	2,108	2,108
R ²	0.171	0.374	0.382	0.400	0.593	0.539
Adjusted R ²	0.169	0.372	0.378	0.388	0.431	0.530
Residual Std. Error	0.972 (df = 2102)	0.845 (df = 2100)	0.841 (df = 2093)	0.834 (df = 2066)	0.804 (df = 1508)	0.731 (df = 2064)
F Statistic	86.931*** (df = 5; 2102)	179.240*** (df = 7; 2100)				

* p<0.1; ** p<0.05; *** p<0.01

Table 6:

	Dependent variable:					
	OLS			felm		
	(1)	(2)	(3)	(4)	(5)	(6)
	Log-salary next season					
fWAR	0.314*** (0.016)	0.292*** (0.014)	0.285*** (0.014)	0.147*** (0.018)	0.083*** (0.021)	0.073*** (0.013)
ABOVE_300	0.159 (0.105)	0.026 (0.090)	0.006 (0.090)	0.016 (0.108)	-0.099 (0.106)	0.057 (0.067)
AGE		0.964*** (0.063)	0.960*** (0.063)			2.060*** (0.068)
AGE_sq		-0.014*** (0.001)	-0.014*** (0.001)			-0.030*** (0.001)
WPA					10.767*** (2.590)	5.104*** (1.659)
nWPA					25.245*** (2.711)	16.875*** (1.760)
fWAR:ABOVE_300	-0.050* (0.027)	-0.013 (0.023)	-0.010 (0.023)	-0.012 (0.026)	0.023 (0.025)	-0.025 (0.016)
Constant	13.566*** (0.033)	-2.169** (0.917)				
Fixed effect						
Observations	-	-	Team	Individual	Individual, Team	Team
R ²	2.063	2.063	2.063	2.063	2.063	2.063
Adjusted R ²	0.263	0.462	0.486	0.681	0.716	0.885
Residual Std. Error	0.262	0.461	0.477	0.555	0.594	0.835
F Statistic	1.048 (df = 2059)	0.896 (df = 2057)	0.882 (df = 2028)	0.814 (df = 1476)	0.777 (df = 1445)	0.495 (df = 1443)
	244.465*** (df = 3; 2059)	353.758*** (df = 5; 2057)				

*p<0.1; **p<0.05; ***p<0.01

Note:

Table 7:

	Dependent variable:					
	OLS			felm		
	(1)	(2)	(3)	(4)	(5)	(6)
	Log-salary next season					
BATTING	0.030*** (0.002)	0.026*** (0.002)	0.026*** (0.002)	0.026*** (0.002)	0.011*** (0.003)	0.010*** (0.002)
ABOVE_300	-0.029 (0.084)	-0.013 (0.073)	-0.020 (0.073)	-0.040 (0.073)	-0.105 (0.083)	-0.113* (0.061)
FIELDING	0.007** (0.003)	0.009*** (0.002)	0.009*** (0.002)	0.007*** (0.002)	0.001 (0.003)	0.005** (0.002)
BaseRun	0.056*** (0.017)	0.069*** (0.015)	0.066*** (0.015)	0.063*** (0.015)	-0.005 (0.017)	0.024* (0.013)
AGE		1.031*** (0.067)	1.052*** (0.068)	1.053*** (0.067)		1.052*** (0.057)
AGE_sq		-0.015*** (0.001)	-0.016*** (0.001)	-0.016*** (0.001)		-0.016*** (0.001)
WPA					9.286*** (2.861)	17.676*** (2.301)
nWPA					28.144*** (2.606)	46.543*** (1.601)
BATTING:ABOVE_300	0.002 (0.003)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)		0.007*** (0.002)
Constant	14.027*** (0.027)	-2.606*** (0.983)				
Fixed effect	-	-	Position	Position, Team	Individual, Position, Team	Position, Team
Observations	2,051	2,051	2,051	2,051	2,051	2,051
R ²	0.226	0.414	0.421	0.452	0.722	0.616
Adjusted R ²	0.224	0.412	0.417	0.441	0.601	0.607
Residual Std. Error	1.076 (df = 2045)	0.937 (df = 2043)	0.933 (df = 2036)	0.914 (df = 2007)	0.772 (df = 1426)	0.766 (df = 2005)
F Statistic	119.371*** (df = 5; 2045)	206.223*** (df = 7; 2043)				

* p<0.1; ** p<0.05; *** p<0.01

Note:

Table 8:

	Dependent variable:					
	OLS			felm		
	(1)	(2)	(3)	(4)	(5)	(6)
	Log-salary next season					
fWAR	0.251*** (0.012)	0.278*** (0.010)	0.273*** (0.010)	0.079*** (0.013)	0.021 (0.016)	0.076*** (0.012)
ABOVE_300	-0.037 (0.105)	-0.135 (0.088)	-0.158* (0.088)	-0.227** (0.106)	-0.276*** (0.105)	-0.105 (0.074)
AGE		1.008*** (0.044)	1.010*** (0.044)			1.779*** (0.047)
AGE_sq		-0.015*** (0.001)	-0.015*** (0.001)			-0.026*** (0.001)
WPA					11.917*** (2.206)	6.367*** (1.553)
nWPA					19.545*** (2.326)	19.447*** (1.644)
fWAR:ABOVE_300	0.013 (0.026)	0.018 (0.022)	0.020 (0.022)	0.021 (0.026)	0.042* (0.025)	0.008 (0.018)
Constant	14.224*** (0.027)	-2.553*** (0.646)				
Fixed effect			Team	Individual	Individual, Team	Team
Observations	- 4,743	- 4,743	4,743	4,743	4,743	4,743
R ²	0.135	0.381	0.396	0.514	0.542	0.774
Adjusted R ²	0.134	0.380	0.392	0.370	0.402	0.705
Residual Std. Error	1.230 (df = 4739)	1.040 (df = 4737)	1.030 (df = 4708)	1.048 (df = 3659)	1.022 (df = 3628)	0.718 (df = 3626)
F Statistic	245.749*** (df = 3; 4739)	583.306*** (df = 5; 4737)				

Note: *p<0.1; **p<0.05; ***p<0.01

Table 9:

	Dependent variable:					
	OLS			felm		
	(1)	(2)	(3)	(4)	(5)	(6)
	Log-salary next season					
BATTING	0.032*** (0.002)	0.031*** (0.001)	0.031*** (0.001)	0.031*** (0.001)	0.011*** (0.002)	0.013*** (0.002)
ABOVE_300	-0.126 (0.080)	-0.152** (0.069)	-0.149** (0.069)	-0.167** (0.068)	-0.234*** (0.079)	-0.230*** (0.062)
FIELDING	0.006** (0.003)	0.008*** (0.002)	0.008*** (0.002)	0.008*** (0.002)	-0.003 (0.003)	0.008*** (0.002)
BaseRun	-0.031*** (0.005)	-0.002 (0.005)	-0.007 (0.005)	-0.006 (0.005)	-0.044*** (0.007)	-0.007 (0.005)
AGE		1.027*** (0.046)	1.052*** (0.045)	1.058*** (0.045)		1.074*** (0.041)
AGE_sq		-0.015*** (0.001)	-0.015*** (0.001)	-0.016*** (0.001)		-0.016*** (0.001)
WPA					9.145*** (2.317)	18.814*** (1.836)
nWPA					20.672*** (2.213)	44.162*** (1.342)
BATTING:ABOVE_300	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	0.009*** (0.002)
Constant	14.607*** (0.019)	-2.230*** (0.670)				
Fixed effect			Position	Position, Team	Individual, Position, Team	Position, Team
Observations	4,724	4,724	4,724	4,724	4,724	4,724
R ²	0.140	0.354	0.366	0.384	0.572	0.501
Adjusted R ²	0.139	0.353	0.364	0.377	0.439	0.496
Residual Std. Error	1.226 (df = 4718)	1.063 (df = 4716)	1.054 (df = 4704)	1.043 (df = 4675)	0.990 (df = 3596)	0.938 (df = 4673)
F Statistic	153.663*** (df = 5; 4718)	368.576*** (df = 7; 4716)				

* p<0.1; ** p<0.05; *** p<0.01

Note:

Table 10:

	<i>Dependent variable:</i>
	Log-salary next season
fWAR	0.165*** (0.046)
ABOVE_300	-0.150 (0.275)
After_MB	1.696*** (0.106)
Before_Strike	-0.431*** (0.101)
ST_MB	0.649*** (0.100)
FIELDING	-0.011*** (0.002)
BaseRun	-0.059*** (0.006)
WPA	9.982*** (1.525)
nWPA	23.496*** (1.462)
fWAR:ABOVE_300	0.031 (0.084)
fWAR:After_MB	-0.054 (0.046)
fWAR:Before_Strike	-0.076 (0.047)
fWAR:ST_MB	-0.015 (0.047)
ABOVE_300TRUE:After_MB	-0.215 (0.289)
ABOVE_300TRUE:Before_Strike	0.108 (0.305)
ABOVE_300TRUE:ST_MB	-0.041 (0.297)
fWAR:ABOVE_300TRUE:After_MB	0.020 (0.087)
fWAR:ABOVE_300TRUE:Before_Strike	0.008 (0.090)
fWAR:ABOVE_300TRUE:ST_MB	-0.021 (0.088)
Fixed effect	Team, Individual
Observations	8,883
R ²	0.607
Adjusted R ²	0.511
Residual Std. Error	0.936 (df = 7151)
<i>Note:</i> *p<0.1; **p<0.05; ***p<0.01	

Table 11:

	<i>Dependent variable:</i>
	Log-salary next season
BATTING	0.012** (0.006)
ABOVE_300	0.018 (0.208)
After_MB	1.554*** (0.084)
Before_Strike	−0.500*** (0.078)
Erastmb	0.612*** (0.077)
FIELDING	0.001 (0.002)
BaseRun	−0.037*** (0.006)
WPA	11.341*** (1.508)
nWPA	27.454*** (1.382)
BATTING:ABOVE_300	−0.00003 (0.010)
BATTING:After_MB	0.001 (0.006)
BATTING:Before_Strike	−0.004 (0.006)
BATTING:ST_MB	0.0004 (0.006)
ABOVE_300TRUE:After_MB	−0.269 (0.219)
ABOVE_300TRUE:Before_Strike	0.033 (0.234)
ABOVE_300TRUE:ST_MB	−0.239 (0.224)
BATTING:ABOVE_300TRUE:After_MB	0.003 (0.010)
BATTING:ABOVE_300TRUE:Before_Strike	0.004 (0.010)
BATTING:ABOVE_300TRUE:ST_MB	0.005 (0.010)
Fixed effect	Position, Team, Individual
Observations	8,883
R ²	0.615
Adjusted R ²	0.521
Residual Std. Error	0.926 (df = 7139)
Note:	*p<0.1; **p<0.05; ***p<0.01

Table 12: OLS on Runs

	Dependent variable:					
	Team Runs					
	(1)	(2)	(3)	(4)	(5)	(6)
AVG	36.162*** (0.870)			14.844*** (0.856)		
OBP		32.515*** (0.548)			18.494*** (0.547)	
SLG			16.578*** (0.277)	12.015*** (0.356)	9.506*** (0.278)	
OPS						12.360*** (0.138)
Constant	-4.874*** (0.228)	-6.123*** (0.181)	-2.236*** (0.114)	-4.241*** (0.152)	-5.416*** (0.121)	-4.570*** (0.103)
Observations	896	896	896	896	896	896
R ²	0.659	0.798	0.800	0.850	0.912	0.899
Adjusted R ²	0.659	0.797	0.799	0.850	0.912	0.899
Residual Std. Error	0.311 (df = 894)	0.240 (df = 894)	0.239 (df = 894)	0.207 (df = 893)	0.158 (df = 893)	0.169 (df = 894)
F Statistic	1,729.301*** (df = 1; 894)	3,521.401*** (df = 1; 894)	3,568.839*** (df = 1; 894)	2,533.648*** (df = 2; 893)	4,638.196*** (df = 2; 893)	7,976.722*** (df = 1; 894)

* p<0.1; ** p<0.05; *** p<0.01

Table 13: OLS on WA

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
AVG	3.460*** (0.115)			1.366*** (0.130)		
OBP		3.157*** (0.078)			1.815*** (0.097)	
SLG			1.656*** (0.041)	1.247*** (0.055)	0.962*** (0.051)	
OPS						1.238*** (0.025)
Runs Allowed	-0.093*** (0.002)	-0.092*** (0.002)	-0.100*** (0.002)	-0.101*** (0.002)	-0.100*** (0.002)	-0.101*** (0.002)
Constant	0.022 (0.029)	-0.117*** (0.025)	0.277*** (0.016)	0.095*** (0.023)	-0.035 (0.022)	0.046*** (0.017)
Observations	896	896	896	896	896	896
R ²	0.675	0.767	0.769	0.794	0.834	0.827
Adjusted R ²	0.674	0.766	0.768	0.793	0.833	0.827
Residual Std. Error	0.039 (df = 893)	0.033 (df = 893)	0.033 (df = 893)	0.031 (df = 892)	0.028 (df = 892)	0.029 (df = 893)
F Statistic	925.821*** (df = 2; 893)	1,469.533*** (df = 2; 893)	1,482.702*** (df = 2; 893)	1,147.337*** (df = 3; 892)	1,492.012*** (df = 3; 892)	2,136.514*** (df = 2; 893)

* p<0.1, ** p<0.05, *** p<0.01

Note: