

proj2

WRANGLING

1.) There was no missing data in the columns that I chose to represent. Because I natural joined over 3 different data frames, the joins were done on columns that the df's had in common.

```
Select franchName, teamID, yearID, SUM(Salary) as Payroll,W, franchID,G, ((1.0 * W/G)
* 100) as Win_percentage
from Salaries natural join Teams natural join TeamsFranchises
where yearID > 1989 and yearID < 2015
group by teamID, yearID
```

```
payroll_df %>%
  head()
```

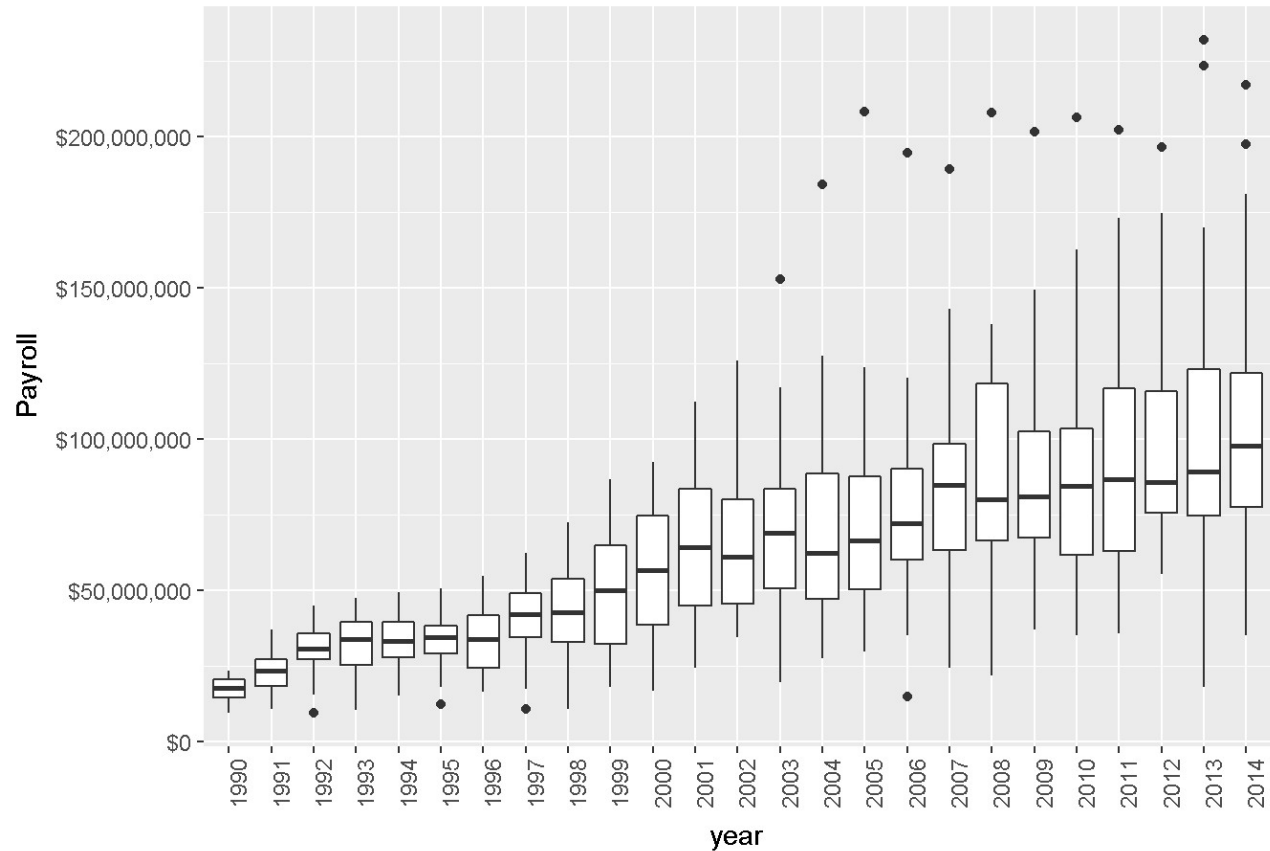
```
##           franchName teamID yearID  Payroll  W franchID  G
## 1      Atlanta Braves   ATL   1990 14555501 65      ATL 162
## 2    Baltimore Orioles   BAL   1990  9680084 76      BAL 161
## 3      Boston Red Sox   BOS   1990 20558333 88      BOS 162
## 4 Los Angeles Angels of Anaheim CAL   1990 21720000 80      ANA 162
## 5      Chicago White Sox  CHA   1990  9491500 94      CHW 162
## 6      Chicago Cubs     CHN   1990 13624000 77      CHC 162
##  Win_percentage
## 1          40.12346
## 2          47.20497
## 3          54.32099
## 4          49.38272
## 5          58.02469
## 6          47.53086
```

Q1.)The mean payroll tends to increase over the years. The range of payrolls also increases over the years.

```
payroll_df_year <- payroll_df%>%mutate(year = factor(yearID))

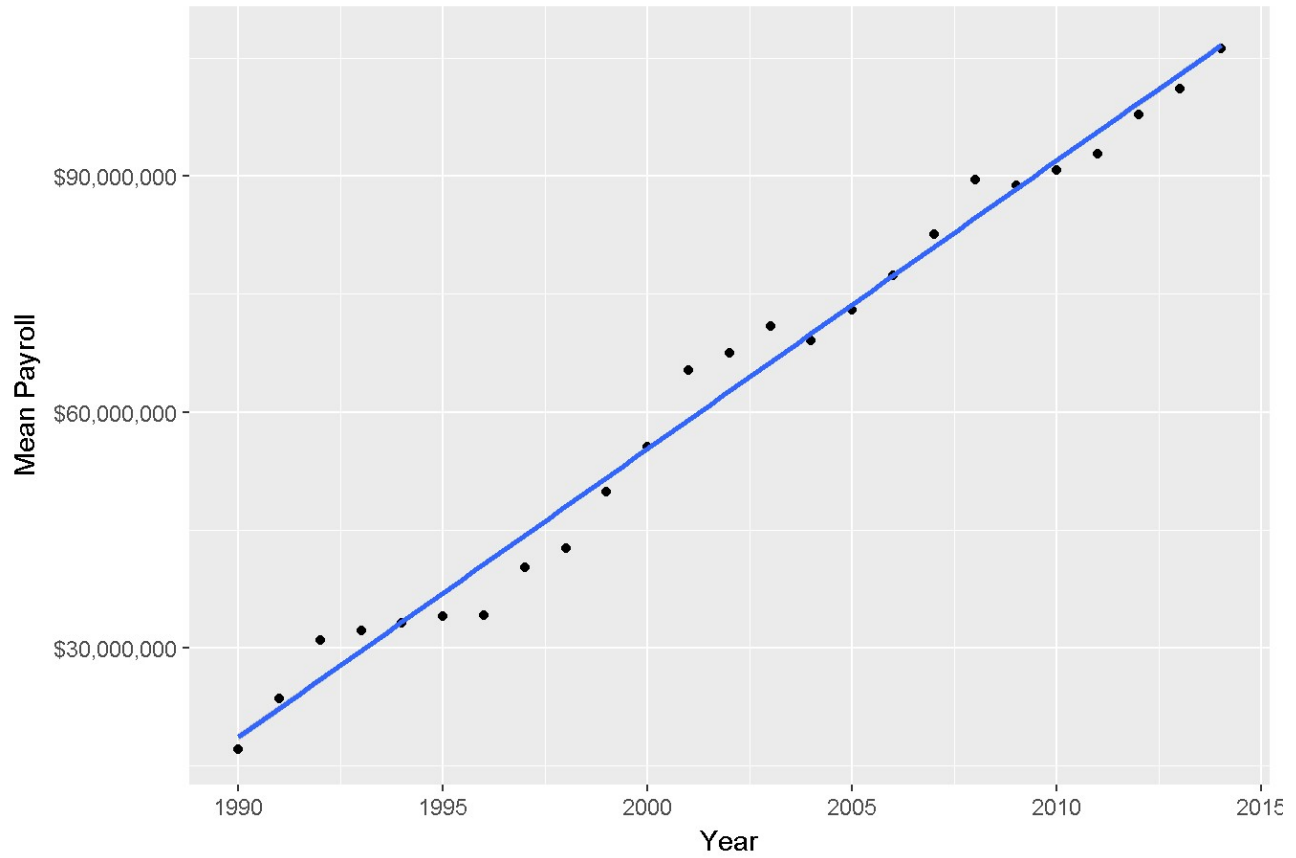
ggplot(data = payroll_df_year, aes(x = year, y = Payroll)) +
  geom_boxplot() + ggtitle("Distribution of Payroll over Time") +
  theme(axis.text.x = element_text(angle = 90, hjust = 1)) + scale_y_continuous(label
s = scales::dollar)
```

Distribution of Payroll over Time



```
payroll_def_mean <- payroll_df %>%
  group_by(yearID) %>%
  mutate(m = mean(Payroll)) %>%
ggplot(aes(x = yearID, y = m)) +
  geom_point() + ylab("Mean Payroll") + xlab("Year") + ggtitle("Mean Payroll Over Time") +
  geom_smooth(method = lm) +
  scale_y_continuous(labels = scales::dollar)
payroll_def_mean
```

Mean Payroll Over Time

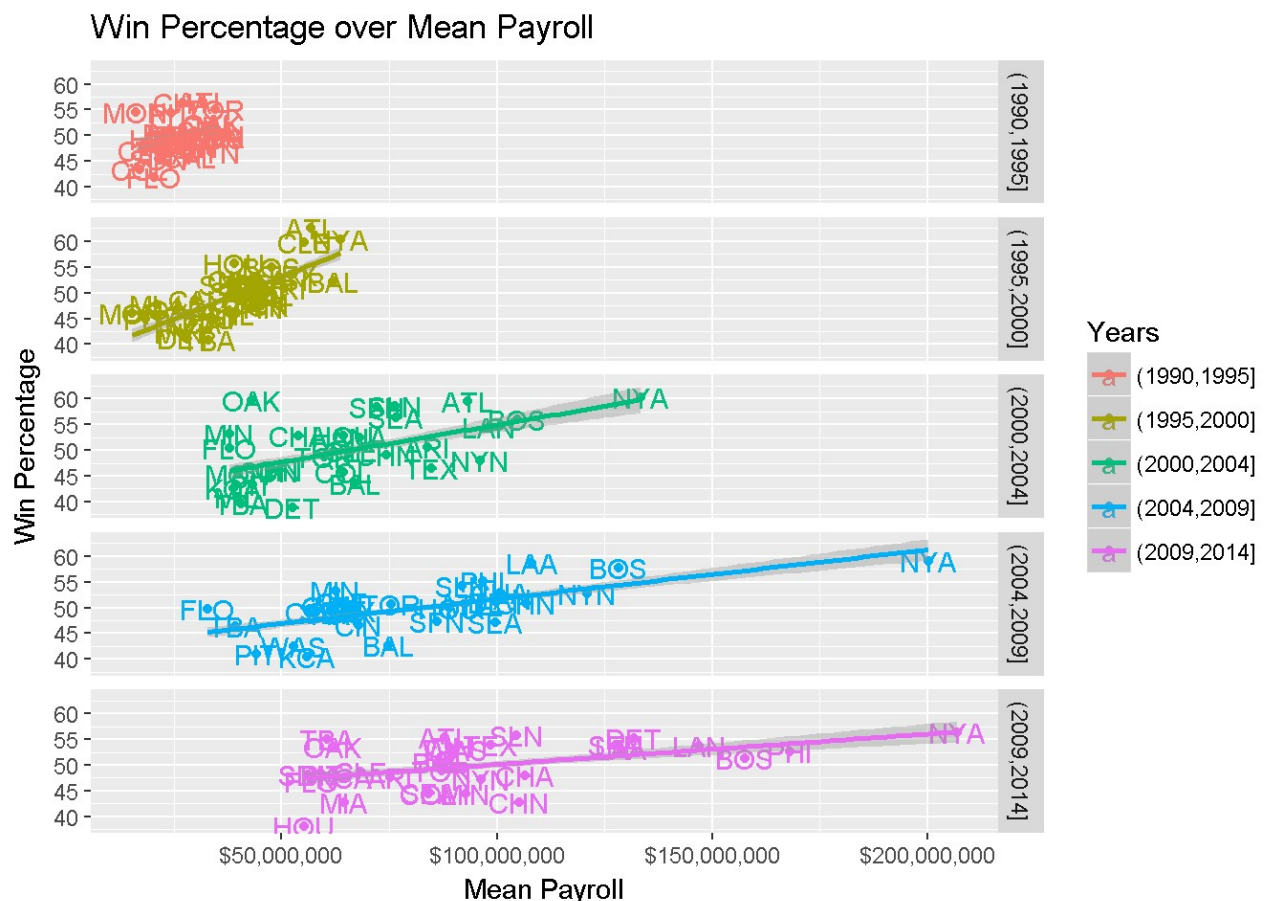


Q2.) Team payrolls between 1990-1995 were relatively close together, but by 2000-2004 teams began investing a lot more in their players, most notably the New York Yankees. In the 2000-2004 era, which is also the Moneyball era, the Oakland A's had an impressive win percentage of around 60% yet spent significantly less than the other teams that achieved a similar win rate (ATL and NYA). However, given the A's success, other teams started catching on in subsequent years and they too started to redefine the value of a baseball player. NYA continued to invest considerable amounts of money into players even after Moneyball. Before the Moneyball era, it is apparent that spending more on players will net a better win percentage. However, by analyzing the change in slope of the regression line, it is evident that while this trend of spending more for wins continues over the years, it is not as significant as pre-Moneyball era.

```

payroll_def_mean <- payroll_df %>%
  mutate(cutted = cut(yearID, breaks = 5)) %>%
  group_by(cutted, teamID) %>%
  mutate(m = mean(Payroll)) %>%
  mutate(wp = mean(Win_percentage)) %>%
  ggplot(aes(x = m, y = wp, color = factor(cutted))) +
  geom_point() +
  facet_grid(cutted~., space = "free") +
  geom_text(aes(label=teamID)) +
  geom_smooth(method =lm) +
  scale_x_continuous(labels = scales::dollar) +
  labs(title = "Win Percentage over Mean Payroll", x = "Mean Payroll", y = "Win Percen
tage", color = "Years")
payroll_def_mean

```



Q3.) For problem 4 our payroll variable was an average(mean) over 5 different 5 year periods, while our payroll variable for problem 6 was was a standardized payroll variable over 1 year for 1 team. The payroll variable will have a mean of 0 and a standard deviation of 1 in problem 6 because it has become standardized. This allows us to compare teams win percentage and payroll based on how they vary from the rest of the data.

```
u1 <- payroll_df %>%  
  group_by(yearID)%>%  
  mutate(cutted = cut(yearID, breaks=5))%>%  
  mutate(avg_year = mean(Payroll)) %>%  
  mutate(std = sd(Payroll))
```

```
## Warning in mutate_impl(.data, dots): Unequal factor levels: coercing to  
## character
```



```
## Warning in mutate_impl(.data, dots): binding character and factor vector,
## coercing into character vector

## Warning in mutate_impl(.data, dots): binding character and factor vector,
## coercing into character vector

## Warning in mutate_impl(.data, dots): binding character and factor vector,
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## coercing into character vector

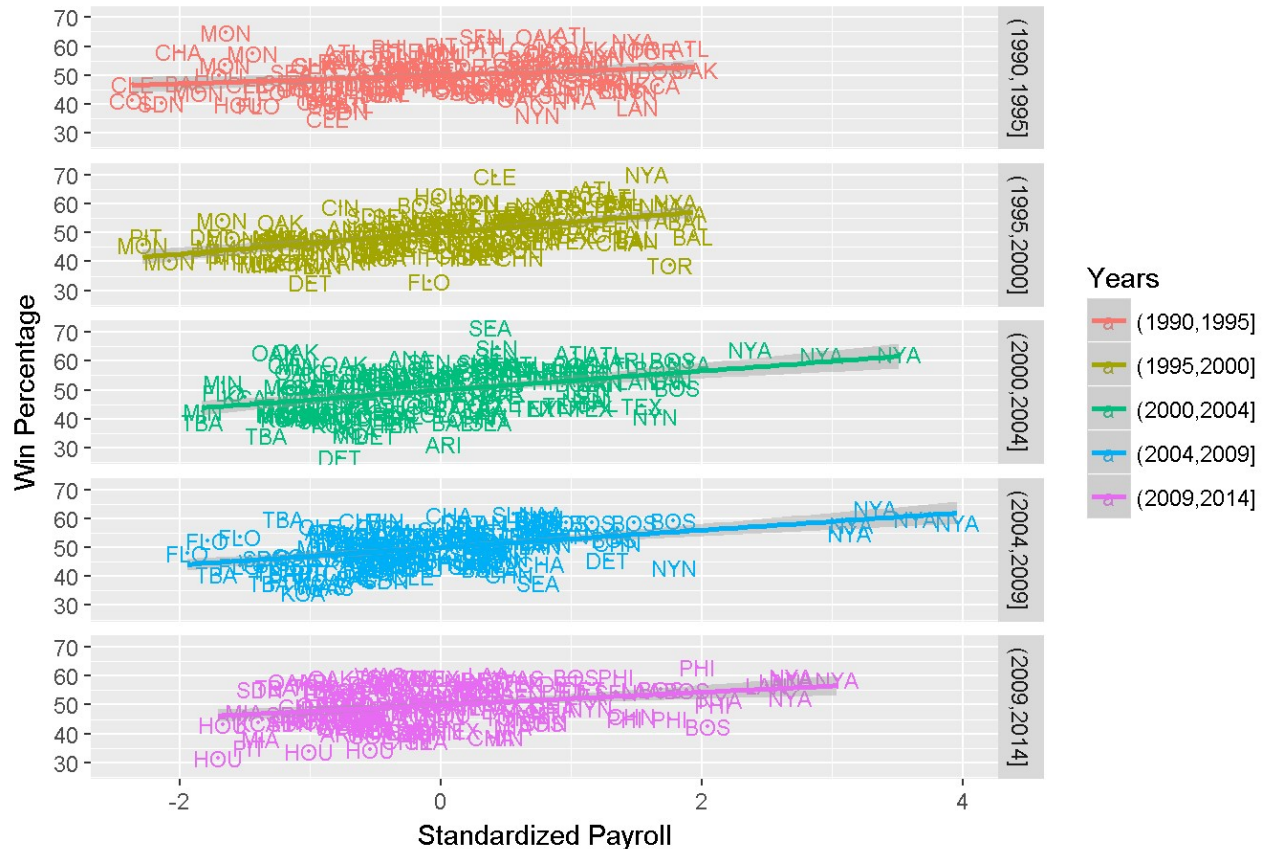
## Warning in mutate_impl(.data, dots): binding character and factor vector,
## coercing into character vector
```

```
standard <- payroll_df %>% left_join(u1) %>%
  mutate(cutted = cut(yearID, breaks=5)) %>%
  group_by(cutted,teamID) %>%
  group_by(yearID,teamID) %>%
  mutate(standardized_payroll = ((Payroll - avg_year)/std)) %>%
  group_by(cutted,teamID) %>%
  ggplot(aes(x = standardized_payroll, y = Win_percentage, color = factor(cutted))) +
  geom_text(aes(label = teamID), size = 3 ) +
  geom_point(size = .3) +
  geom_smooth(method = lm) +
  facet_grid(cutted~.) +
  labs(title = "Win Percentage over Standardized Payroll", x = "Standardized Payroll", y = "Win Percentage", color = "Years")
```

```
## Joining, by = c("franchName", "teamID", "yearID", "Payroll", "W", "franchID", "G",
"Win_percentage")
```

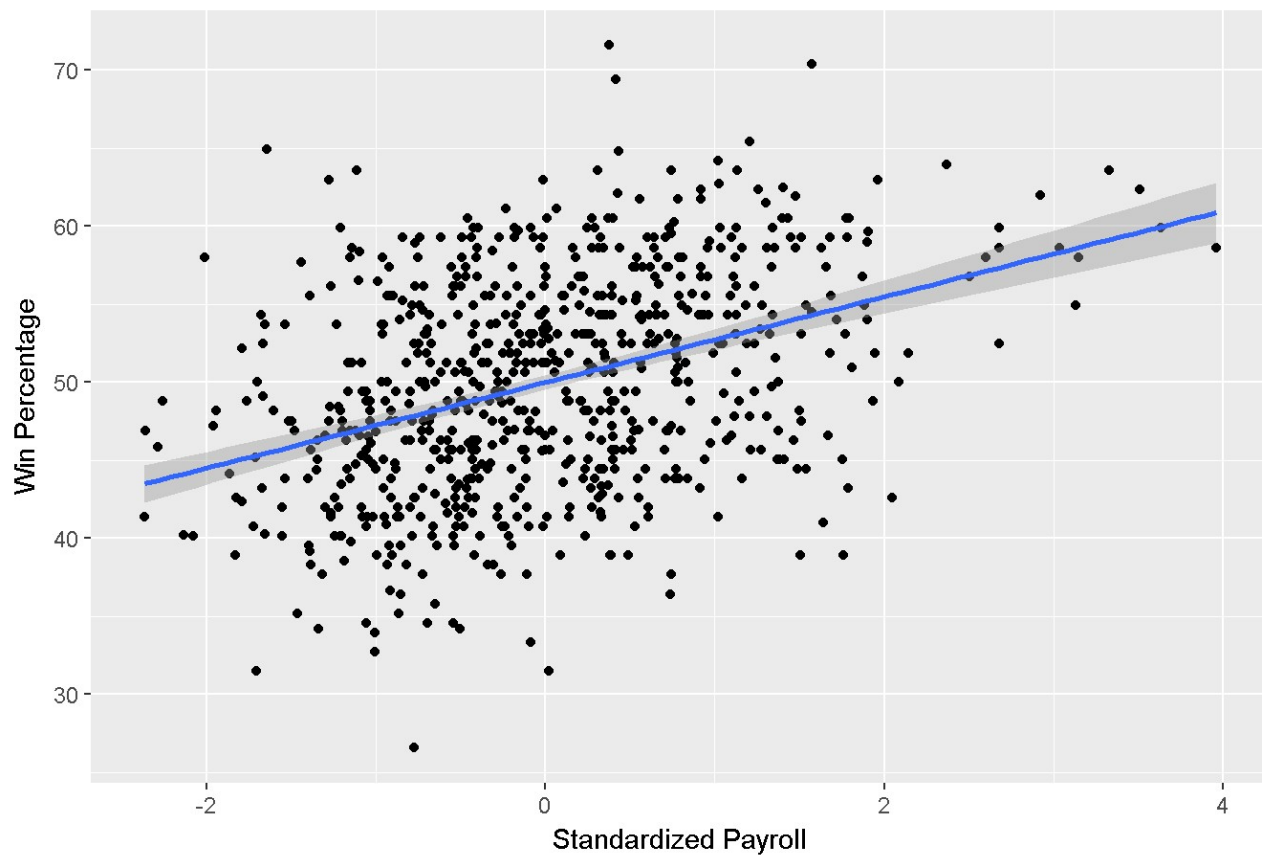
```
standard
```

Win Percentage over Standardized Payroll



```
payroll_df %>%
  group_by(yearID) %>%
  mutate(avg_year = mean(Payroll)) %>%
  mutate(standardized = ((Payroll - avg_year)/sd(Payroll))) %>%
  ggplot(aes(x = standardized, y = Win_percentage)) +
  geom_point() + ylab("Win Percentage") + xlab("Standardized Payroll") + ggtitle("Win
Percentage Over Standardized Payroll") + geom_smooth(method =lm)
```


Win Percentage Over Standardized Payroll



payroll_df

##		franchName	teamID	yearID	Payroll	W	franchID	G
## 1		Atlanta Braves	ATL	1990	14555501	65	ATL	162
## 2		Baltimore Orioles	BAL	1990	9680084	76	BAL	161
## 3		Boston Red Sox	BOS	1990	20558333	88	BOS	162
## 4	Los Angeles	Angels of Anaheim	CAL	1990	21720000	80	ANA	162
## 5		Chicago White Sox	CHA	1990	9491500	94	CHW	162
## 6		Chicago Cubs	CHN	1990	13624000	77	CHC	162
## 7		Cincinnati Reds	CIN	1990	14370000	91	CIN	162
## 8		Cleveland Indians	CLE	1990	14487000	77	CLE	162
## 9		Detroit Tigers	DET	1990	17593238	79	DET	162
## 10		Houston Astros	HOU	1990	18330000	75	HOU	162
## 11		Kansas City Royals	KCA	1990	23361084	75	KCR	161
## 12		Los Angeles Dodgers	LAN	1990	21318704	86	LAD	162
## 13		Minnesota Twins	MIN	1990	14602000	74	MIN	162
## 14		Milwaukee Brewers	ML4	1990	19719167	74	MIL	162
## 15		Washington Nationals	MON	1990	16586388	85	WSN	162
## 16		New York Yankees	NYA	1990	20912318	67	NYN	162
## 17		New York Mets	NYN	1990	21722834	91	NYM	162
## 18		Oakland Athletics	OAK	1990	19887501	103	OAK	162
## 19		Philadelphia Phillies	PHI	1990	13173667	77	PHI	162
## 20		Pittsburgh Pirates	PIT	1990	15556000	95	PIT	162
## 21		San Diego Padres	SDN	1990	17588334	75	SDP	162
## 22		Seattle Mariners	SEA	1990	12553667	77	SEA	162
## 23		San Francisco Giants	SFN	1990	19335333	85	SFG	162
## 24		St. Louis Cardinals	SLN	1990	20523334	70	STL	162
## 25		Texas Rangers	TEX	1990	14874372	83	TEX	162
## 26		Toronto Blue Jays	TOR	1990	17756834	86	TOR	162
## 27		Atlanta Braves	ATL	1991	18403500	94	ATL	162
## 28		Baltimore Orioles	BAL	1991	17519000	67	BAL	162
## 29		Boston Red Sox	BOS	1991	35167500	84	BOS	162
## 30	Los Angeles	Angels of Anaheim	CAL	1991	33060001	81	ANA	162
## 31		Chicago White Sox	CHA	1991	16919667	87	CHW	162
## 32		Chicago Cubs	CHN	1991	23175667	77	CHC	160
## 33		Cincinnati Reds	CIN	1991	26305333	74	CIN	162
## 34		Cleveland Indians	CLE	1991	17635000	57	CLE	162
## 35		Detroit Tigers	DET	1991	23838333	84	DET	162
## 36		Houston Astros	HOU	1991	12852500	65	HOU	162
## 37		Kansas City Royals	KCA	1991	26319834	82	KCR	162
## 38		Los Angeles Dodgers	LAN	1991	32790664	93	LAD	162
## 39		Minnesota Twins	MIN	1991	23361833	95	MIN	162
## 40		Milwaukee Brewers	ML4	1991	23115500	83	MIL	162
## 41		Washington Nationals	MON	1991	10732333	71	WSN	161
## 42		New York Yankees	NYA	1991	27344168	71	NYN	162
## 43		New York Mets	NYN	1991	32590001	77	NYM	161
## 44		Oakland Athletics	OAK	1991	36999167	84	OAK	162
## 45		Philadelphia Phillies	PHI	1991	22487332	78	PHI	162
## 46		Pittsburgh Pirates	PIT	1991	23634667	98	PIT	162
## 47		San Diego Padres	SDN	1991	22150001	84	SDP	162

## 48	Seattle Mariners	SEA	1991	15691833	83	SEA 162
## 49	San Francisco Giants	SFN	1991	30967666	75	SFG 162
## 50	St. Louis Cardinals	SLN	1991	21860001	84	STL 162
## 51	Texas Rangers	TEX	1991	18224500	85	TEX 162
## 52	Toronto Blue Jays	TOR	1991	19902417	91	TOR 162
## 53	Atlanta Braves	ATL	1992	34625333	98	ATL 162
## 54	Baltimore Orioles	BAL	1992	23780667	89	BAL 162
## 55	Boston Red Sox	BOS	1992	43610584	73	BOS 162
## 56	Los Angeles Angels of Anaheim	CAL	1992	34749334	72	ANA 162
## 57	Chicago White Sox	CHA	1992	30160833	86	CHW 162
## 58	Chicago Cubs	CHN	1992	29829686	78	CHC 162
## 59	Cincinnati Reds	CIN	1992	35931499	90	CIN 162
## 60	Cleveland Indians	CLE	1992	9373044	76	CLE 162
## 61	Detroit Tigers	DET	1992	27322834	75	DET 162
## 62	Houston Astros	HOU	1992	15407500	81	HOU 162
## 63	Kansas City Royals	KCA	1992	33893834	72	KCR 162
## 64	Los Angeles Dodgers	LAN	1992	44788166	63	LAD 162
## 65	Minnesota Twins	MIN	1992	28027834	90	MIN 162
## 66	Milwaukee Brewers	ML4	1992	31013667	92	MIL 162
## 67	Washington Nationals	MON	1992	15822334	87	WSN 162
## 68	New York Yankees	NYA	1992	37543334	76	NYN 162
## 69	New York Mets	NYN	1992	44602002	72	NYM 162
## 70	Oakland Athletics	OAK	1992	41035000	96	OAK 162
## 71	Philadelphia Phillies	PHI	1992	24383834	70	PHI 162
## 72	Pittsburgh Pirates	PIT	1992	33944167	96	PIT 162
## 73	San Diego Padres	SDN	1992	26854167	82	SDP 162
## 74	Seattle Mariners	SEA	1992	23179833	64	SEA 162
## 75	San Francisco Giants	SFN	1992	33163168	72	SFG 162
## 76	St. Louis Cardinals	SLN	1992	27583836	83	STL 162
## 77	Texas Rangers	TEX	1992	30128167	77	TEX 162
## 78	Toronto Blue Jays	TOR	1992	44788666	96	TOR 162
## 79	Atlanta Braves	ATL	1993	41641417	104	ATL 162
## 80	Baltimore Orioles	BAL	1993	29096500	85	BAL 162
## 81	Boston Red Sox	BOS	1993	37120583	80	BOS 162
## 82	Los Angeles Angels of Anaheim	CAL	1993	28588334	71	ANA 162
## 83	Chicago White Sox	CHA	1993	39696166	94	CHW 162
## 84	Chicago Cubs	CHN	1993	39386666	84	CHC 163
## 85	Cincinnati Reds	CIN	1993	44879666	73	CIN 162
## 86	Cleveland Indians	CLE	1993	18561000	76	CLE 162
## 87	Colorado Rockies	COL	1993	10353500	67	COL 162
## 88	Detroit Tigers	DET	1993	38150165	85	DET 162
## 89	Florida Marlins	FLO	1993	19330545	64	FLA 162
## 90	Houston Astros	HOU	1993	30210500	85	HOU 162
## 91	Kansas City Royals	KCA	1993	41346167	84	KCR 162
## 92	Los Angeles Dodgers	LAN	1993	39331999	81	LAD 162
## 93	Minnesota Twins	MIN	1993	28217933	71	MIN 162
## 94	Milwaukee Brewers	ML4	1993	23806834	69	MIL 162
## 95	Washington Nationals	MON	1993	18899333	94	WSN 163
## 96	New York Yankees	NYA	1993	42624900	88	NYN 162

## 97	New York Mets	NYN	1993	39043667	59	NYM 162
## 98	Oakland Athletics	OAK	1993	37812333	68	OAK 162
## 99	Philadelphia Phillies	PHI	1993	28538334	97	PHI 162
## 100	Pittsburgh Pirates	PIT	1993	24822467	75	PIT 162
## 101	San Diego Padres	SDN	1993	25511333	61	SDP 162
## 102	Seattle Mariners	SEA	1993	32696333	82	SEA 162
## 103	San Francisco Giants	SFN	1993	35050000	103	SFG 162
## 104	St. Louis Cardinals	SLN	1993	23367334	87	STL 162
## 105	Texas Rangers	TEX	1993	36376959	86	TEX 162
## 106	Toronto Blue Jays	TOR	1993	47279166	95	TOR 162
## 107	Atlanta Braves	ATL	1994	49383513	68	ATL 114
## 108	Baltimore Orioles	BAL	1994	38849769	63	BAL 112
## 109	Boston Red Sox	BOS	1994	37859084	54	BOS 115
## 110	Los Angeles Angels of Anaheim	CAL	1994	25156218	47	ANA 115
## 111	Chicago White Sox	CHA	1994	39183836	67	CHW 113
## 112	Chicago Cubs	CHN	1994	36287333	49	CHC 113
## 113	Cincinnati Reds	CIN	1994	40961833	66	CIN 115
## 114	Cleveland Indians	CLE	1994	30490500	66	CLE 113
## 115	Colorado Rockies	COL	1994	23887333	53	COL 117
## 116	Detroit Tigers	DET	1994	41446501	53	DET 115
## 117	Florida Marlins	FLO	1994	21633000	51	FLA 115
## 118	Houston Astros	HOU	1994	33126000	66	HOU 115
## 119	Kansas City Royals	KCA	1994	40541334	64	KCR 115
## 120	Los Angeles Dodgers	LAN	1994	38000001	58	LAD 114
## 121	Minnesota Twins	MIN	1994	28438500	53	MIN 113
## 122	Milwaukee Brewers	ML4	1994	24350500	53	MIL 115
## 123	Washington Nationals	MON	1994	19098000	74	WSN 114
## 124	New York Yankees	NYA	1994	45731334	70	NYY 113
## 125	New York Mets	NYN	1994	30956583	55	NYM 113
## 126	Oakland Athletics	OAK	1994	34172500	51	OAK 114
## 127	Philadelphia Phillies	PHI	1994	31599000	54	PHI 115
## 128	Pittsburgh Pirates	PIT	1994	24217250	53	PIT 114
## 129	San Diego Padres	SDN	1994	14916333	47	SDP 117
## 130	Seattle Mariners	SEA	1994	29228500	49	SEA 112
## 131	San Francisco Giants	SFN	1994	42638666	55	SFG 115
## 132	St. Louis Cardinals	SLN	1994	29275601	53	STL 115
## 133	Texas Rangers	TEX	1994	32973597	52	TEX 114
## 134	Toronto Blue Jays	TOR	1994	43433668	55	TOR 115
## 135	Atlanta Braves	ATL	1995	47235445	90	ATL 144
## 136	Baltimore Orioles	BAL	1995	43942521	71	BAL 144
## 137	Boston Red Sox	BOS	1995	32455518	86	BOS 144
## 138	Los Angeles Angels of Anaheim	CAL	1995	31223171	78	ANA 145
## 139	Chicago White Sox	CHA	1995	46961282	68	CHW 145
## 140	Chicago Cubs	CHN	1995	29505834	73	CHC 144
## 141	Cincinnati Reds	CIN	1995	43144670	85	CIN 144
## 142	Cleveland Indians	CLE	1995	37937835	100	CLE 144
## 143	Colorado Rockies	COL	1995	34154717	77	COL 144
## 144	Detroit Tigers	DET	1995	37044168	60	DET 144
## 145	Florida Marlins	FLO	1995	24515781	67	FLA 143

## 146	Houston Astros	HOU	1995	34169834	76	HOU 144
## 147	Kansas City Royals	KCA	1995	29532834	70	KCR 144
## 148	Los Angeles Dodgers	LAN	1995	39273201	78	LAD 144
## 149	Minnesota Twins	MIN	1995	25410500	56	MIN 144
## 150	Milwaukee Brewers	ML4	1995	17798825	65	MIL 144
## 151	Washington Nationals	MON	1995	12364000	66	WSN 144
## 152	New York Yankees	NYA	1995	48874851	79	NYN 145
## 153	New York Mets	NYN	1995	27674992	69	NYM 144
## 154	Oakland Athletics	OAK	1995	37739225	67	OAK 144
## 155	Philadelphia Phillies	PHI	1995	30555945	69	PHI 144
## 156	Pittsburgh Pirates	PIT	1995	18355345	58	PIT 144
## 157	San Diego Padres	SDN	1995	26382334	70	SDP 144
## 158	Seattle Mariners	SEA	1995	36481311	79	SEA 145
## 159	San Francisco Giants	SFN	1995	36462777	67	SFG 144
## 160	St. Louis Cardinals	SLN	1995	37101000	62	STL 143
## 161	Texas Rangers	TEX	1995	34581451	74	TEX 144
## 162	Toronto Blue Jays	TOR	1995	50590000	56	TOR 144
## 163	Atlanta Braves	ATL	1996	49698500	96	ATL 162
## 164	Baltimore Orioles	BAL	1996	54490315	88	BAL 163
## 165	Boston Red Sox	BOS	1996	42393500	85	BOS 162
## 166	Los Angeles Angels of Anaheim	CAL	1996	28738000	70	ANA 161
## 167	Chicago White Sox	CHA	1996	45139500	85	CHW 162
## 168	Chicago Cubs	CHN	1996	33081000	76	CHC 162
## 169	Cincinnati Reds	CIN	1996	42526334	81	CIN 162
## 170	Cleveland Indians	CLE	1996	48107360	99	CLE 161
## 171	Colorado Rockies	COL	1996	40179823	83	COL 162
## 172	Detroit Tigers	DET	1996	23438000	53	DET 162
## 173	Florida Marlins	FLO	1996	31022500	80	FLA 162
## 174	Houston Astros	HOU	1996	28487000	82	HOU 162
## 175	Kansas City Royals	KCA	1996	20281250	75	KCR 161
## 176	Los Angeles Dodgers	LAN	1996	35355000	90	LAD 162
## 177	Minnesota Twins	MIN	1996	23117000	78	MIN 162
## 178	Milwaukee Brewers	ML4	1996	21730000	80	MIL 162
## 179	Washington Nationals	MON	1996	16264500	88	WSN 162
## 180	New York Yankees	NYA	1996	54191792	92	NYN 162
## 181	New York Mets	NYN	1996	24479500	71	NYM 162
## 182	Oakland Athletics	OAK	1996	21243000	78	OAK 162
## 183	Philadelphia Phillies	PHI	1996	34314500	67	PHI 162
## 184	Pittsburgh Pirates	PIT	1996	23017500	73	PIT 162
## 185	San Diego Padres	SDN	1996	28348172	91	SDP 162
## 186	Seattle Mariners	SEA	1996	41328501	85	SEA 161
## 187	San Francisco Giants	SFN	1996	37144725	68	SFG 162
## 188	St. Louis Cardinals	SLN	1996	40269667	88	STL 162
## 189	Texas Rangers	TEX	1996	39041528	90	TEX 163
## 190	Toronto Blue Jays	TOR	1996	29555083	74	TOR 162
## 191	Los Angeles Angels of Anaheim	ANA	1997	31135472	84	ANA 162
## 192	Atlanta Braves	ATL	1997	52278500	101	ATL 162
## 193	Baltimore Orioles	BAL	1997	58516400	98	BAL 162
## 194	Boston Red Sox	BOS	1997	43558750	78	BOS 162

## 195	Chicago White Sox	CHA	1997	57740000	80	CHW 161
## 196	Chicago Cubs	CHN	1997	42155333	68	CHC 162
## 197	Cincinnati Reds	CIN	1997	49768000	76	CIN 162
## 198	Cleveland Indians	CLE	1997	56802460	86	CLE 161
## 199	Colorado Rockies	COL	1997	43559667	83	COL 162
## 200	Detroit Tigers	DET	1997	17272000	79	DET 162
## 201	Florida Marlins	FLO	1997	48692500	92	FLA 162
## 202	Houston Astros	HOU	1997	34777500	84	HOU 162
## 203	Kansas City Royals	KCA	1997	34655000	67	KCR 161
## 204	Los Angeles Dodgers	LAN	1997	45380304	88	LAD 162
## 205	Minnesota Twins	MIN	1997	34072500	68	MIN 162
## 206	Milwaukee Brewers	ML4	1997	23655338	78	MIL 161
## 207	Washington Nationals	MON	1997	19295500	78	WSN 162
## 208	New York Yankees	NYA	1997	62241545	96	NYY 162
## 209	New York Mets	NYN	1997	39800400	88	NYM 162
## 210	Oakland Athletics	OAK	1997	24018500	65	OAK 162
## 211	Philadelphia Phillies	PHI	1997	36656500	68	PHI 162
## 212	Pittsburgh Pirates	PIT	1997	10771667	79	PIT 162
## 213	San Diego Padres	SDN	1997	37363672	76	SDP 162
## 214	Seattle Mariners	SEA	1997	41540661	90	SEA 162
## 215	San Francisco Giants	SFN	1997	35592378	90	SFG 162
## 216	St. Louis Cardinals	SLN	1997	45456667	73	STL 162
## 217	Texas Rangers	TEX	1997	53448838	77	TEX 162
## 218	Toronto Blue Jays	TOR	1997	47079833	76	TOR 162
## 219	Los Angeles Angels of Anaheim	ANA	1998	41281000	85	ANA 162
## 220	Arizona Diamondbacks	ARI	1998	32347000	65	ARI 162
## 221	Atlanta Braves	ATL	1998	61186000	106	ATL 162
## 222	Baltimore Orioles	BAL	1998	72355634	79	BAL 162
## 223	Boston Red Sox	BOS	1998	56757000	92	BOS 162
## 224	Chicago White Sox	CHA	1998	38335000	80	CHW 163
## 225	Chicago Cubs	CHN	1998	50838000	90	CHC 163
## 226	Cincinnati Reds	CIN	1998	23005000	77	CIN 162
## 227	Cleveland Indians	CLE	1998	60800166	89	CLE 162
## 228	Colorado Rockies	COL	1998	50484648	77	COL 162
## 229	Detroit Tigers	DET	1998	24065000	65	DET 162
## 230	Florida Marlins	FLO	1998	41322667	54	FLA 162
## 231	Houston Astros	HOU	1998	42374000	102	HOU 162
## 232	Kansas City Royals	KCA	1998	36862500	72	KCR 161
## 233	Los Angeles Dodgers	LAN	1998	48820000	83	LAD 162
## 234	Milwaukee Brewers	MIL	1998	33914904	74	MIL 162
## 235	Minnesota Twins	MIN	1998	27927500	70	MIN 162
## 236	Washington Nationals	MON	1998	10641500	65	WSN 162
## 237	New York Yankees	NYA	1998	66806867	114	NYY 162
## 238	New York Mets	NYN	1998	52077999	88	NYM 162
## 239	Oakland Athletics	OAK	1998	21303000	74	OAK 162
## 240	Philadelphia Phillies	PHI	1998	36297500	75	PHI 162
## 241	Pittsburgh Pirates	PIT	1998	15065000	69	PIT 163
## 242	San Diego Padres	SDN	1998	46861500	98	SDP 162
## 243	Seattle Mariners	SEA	1998	54087036	76	SEA 161

## 244	San Francisco Giants	SFN	1998	42565834	89	SFG 163
## 245	St. Louis Cardinals	SLN	1998	54672521	83	STL 163
## 246	Tampa Bay Rays	TBA	1998	27280000	63	TBD 162
## 247	Texas Rangers	TEX	1998	56572095	88	TEX 162
## 248	Toronto Blue Jays	TOR	1998	51376000	88	TOR 163
## 249	Los Angeles Angels of Anaheim	ANA	1999	55388166	70	ANA 162
## 250	Arizona Diamondbacks	ARI	1999	68703999	100	ARI 162
## 251	Atlanta Braves	ATL	1999	73140000	103	ATL 162
## 252	Baltimore Orioles	BAL	1999	80605863	78	BAL 162
## 253	Boston Red Sox	BOS	1999	63497500	94	BOS 162
## 254	Chicago White Sox	CHA	1999	25620000	75	CHW 162
## 255	Chicago Cubs	CHN	1999	62343000	67	CHC 162
## 256	Cincinnati Reds	CIN	1999	33962761	96	CIN 163
## 257	Cleveland Indians	CLE	1999	72978462	97	CLE 162
## 258	Colorado Rockies	COL	1999	61935837	72	COL 162
## 259	Detroit Tigers	DET	1999	36489666	69	DET 161
## 260	Florida Marlins	FLO	1999	21085000	64	FLA 162
## 261	Houston Astros	HOU	1999	54914000	97	HOU 162
## 262	Kansas City Royals	KCA	1999	26225000	64	KCR 161
## 263	Los Angeles Dodgers	LAN	1999	80862453	77	LAD 162
## 264	Milwaukee Brewers	MIL	1999	43377395	74	MIL 161
## 265	Minnesota Twins	MIN	1999	21257500	63	MIN 161
## 266	Washington Nationals	MON	1999	17903000	68	WSN 162
## 267	New York Yankees	NYA	1999	86734359	98	NYN 162
## 268	New York Mets	NYN	1999	65092092	97	NYM 163
## 269	Oakland Athletics	OAK	1999	24431833	87	OAK 162
## 270	Philadelphia Phillies	PHI	1999	31692500	77	PHI 162
## 271	Pittsburgh Pirates	PIT	1999	24697666	78	PIT 161
## 272	San Diego Padres	SDN	1999	49768179	74	SDP 162
## 273	Seattle Mariners	SEA	1999	54125003	79	SEA 162
## 274	San Francisco Giants	SFN	1999	46595057	86	SFG 162
## 275	St. Louis Cardinals	SLN	1999	49778195	75	STL 161
## 276	Tampa Bay Rays	TBA	1999	38870000	69	TBD 162
## 277	Texas Rangers	TEX	1999	76709931	95	TEX 162
## 278	Toronto Blue Jays	TOR	1999	45444333	84	TOR 162
## 279	Los Angeles Angels of Anaheim	ANA	2000	51464167	82	ANA 162
## 280	Arizona Diamondbacks	ARI	2000	81027833	85	ARI 162
## 281	Atlanta Braves	ATL	2000	84537836	95	ATL 162
## 282	Baltimore Orioles	BAL	2000	81447435	74	BAL 162
## 283	Boston Red Sox	BOS	2000	77940333	85	BOS 162
## 284	Chicago White Sox	CHA	2000	31133500	95	CHW 162
## 285	Chicago Cubs	CHN	2000	60539333	65	CHC 162
## 286	Cincinnati Reds	CIN	2000	46867200	85	CIN 163
## 287	Cleveland Indians	CLE	2000	75880771	90	CLE 162
## 288	Colorado Rockies	COL	2000	61111190	82	COL 162
## 289	Detroit Tigers	DET	2000	58265167	79	DET 162
## 290	Florida Marlins	FLO	2000	19872000	79	FLA 161
## 291	Houston Astros	HOU	2000	51289111	72	HOU 162
## 292	Kansas City Royals	KCA	2000	23433000	77	KCR 162

## 293	Los Angeles Dodgers	LAN	2000	87924286	86	LAD 162
## 294	Milwaukee Brewers	MIL	2000	36505333	73	MIL 163
## 295	Minnesota Twins	MIN	2000	16519500	69	MIN 162
## 296	Washington Nationals	MON	2000	32994333	67	WSN 162
## 297	New York Yankees	NYA	2000	92338260	87	NYN 161
## 298	New York Mets	NYN	2000	79509776	94	NYM 162
## 299	Oakland Athletics	OAK	2000	31971333	91	OAK 161
## 300	Philadelphia Phillies	PHI	2000	47308000	65	PHI 162
## 301	Pittsburgh Pirates	PIT	2000	28928334	69	PIT 162
## 302	San Diego Padres	SDN	2000	54821000	76	SDP 162
## 303	Seattle Mariners	SEA	2000	58915000	91	SEA 162
## 304	San Francisco Giants	SFN	2000	53737826	97	SFG 162
## 305	St. Louis Cardinals	SLN	2000	61453863	95	STL 162
## 306	Tampa Bay Rays	TBA	2000	62765129	69	TBD 161
## 307	Texas Rangers	TEX	2000	70795921	71	TEX 162
## 308	Toronto Blue Jays	TOR	2000	44838332	83	TOR 162
## 309	Los Angeles Angels of Anaheim	ANA	2001	47535167	75	ANA 162
## 310	Arizona Diamondbacks	ARI	2001	85082999	92	ARI 162
## 311	Atlanta Braves	ATL	2001	91936166	88	ATL 162
## 312	Baltimore Orioles	BAL	2001	67599540	63	BAL 162
## 313	Boston Red Sox	BOS	2001	110035833	82	BOS 161
## 314	Chicago White Sox	CHA	2001	65653667	83	CHW 162
## 315	Chicago Cubs	CHN	2001	64715833	88	CHC 162
## 316	Cincinnati Reds	CIN	2001	48986000	66	CIN 162
## 317	Cleveland Indians	CLE	2001	93152001	91	CLE 162
## 318	Colorado Rockies	COL	2001	71541334	73	COL 162
## 319	Detroit Tigers	DET	2001	53416167	66	DET 162
## 320	Florida Marlins	FLO	2001	35762500	76	FLA 162
## 321	Houston Astros	HOU	2001	60612667	93	HOU 162
## 322	Kansas City Royals	KCA	2001	35422500	65	KCR 162
## 323	Los Angeles Dodgers	LAN	2001	109105953	86	LAD 162
## 324	Milwaukee Brewers	MIL	2001	43886833	68	MIL 162
## 325	Minnesota Twins	MIN	2001	24130000	85	MIN 162
## 326	Washington Nationals	MON	2001	35159500	68	WSN 162
## 327	New York Yankees	NYA	2001	112287143	95	NYN 161
## 328	New York Mets	NYN	2001	93174428	82	NYM 162
## 329	Oakland Athletics	OAK	2001	33810750	102	OAK 162
## 330	Philadelphia Phillies	PHI	2001	41663833	86	PHI 162
## 331	Pittsburgh Pirates	PIT	2001	57760833	62	PIT 162
## 332	San Diego Padres	SDN	2001	39182833	79	SDP 162
## 333	Seattle Mariners	SEA	2001	74720834	116	SEA 162
## 334	San Francisco Giants	SFN	2001	63280167	90	SFG 162
## 335	St. Louis Cardinals	SLN	2001	78538333	93	STL 162
## 336	Tampa Bay Rays	TBA	2001	56980000	62	TBD 162
## 337	Texas Rangers	TEX	2001	88633500	73	TEX 162
## 338	Toronto Blue Jays	TOR	2001	76895999	80	TOR 162
## 339	Los Angeles Angels of Anaheim	ANA	2002	61721667	99	ANA 162
## 340	Arizona Diamondbacks	ARI	2002	102819999	98	ARI 162
## 341	Atlanta Braves	ATL	2002	92870367	101	ATL 161

## 342	Baltimore Orioles	BAL	2002	60493487	67	BAL 162
## 343	Boston Red Sox	BOS	2002	108366060	93	BOS 162
## 344	Chicago White Sox	CHA	2002	57052833	81	CHW 162
## 345	Chicago Cubs	CHN	2002	75690833	67	CHC 162
## 346	Cincinnati Reds	CIN	2002	45050390	78	CIN 162
## 347	Cleveland Indians	CLE	2002	78909449	74	CLE 162
## 348	Colorado Rockies	COL	2002	56851043	73	COL 162
## 349	Detroit Tigers	DET	2002	55048000	55	DET 161
## 350	Florida Marlins	FLO	2002	41979917	79	FLA 162
## 351	Houston Astros	HOU	2002	63448417	84	HOU 162
## 352	Kansas City Royals	KCA	2002	47257000	62	KCR 162
## 353	Los Angeles Dodgers	LAN	2002	94850953	92	LAD 162
## 354	Milwaukee Brewers	MIL	2002	50287833	56	MIL 162
## 355	Minnesota Twins	MIN	2002	40425000	94	MIN 161
## 356	Washington Nationals	MON	2002	38670500	83	WSN 162
## 357	New York Yankees	NYA	2002	125928583	103	NYN 161
## 358	New York Mets	NYN	2002	94633593	75	NYM 161
## 359	Oakland Athletics	OAK	2002	40004167	103	OAK 162
## 360	Philadelphia Phillies	PHI	2002	57954999	80	PHI 161
## 361	Pittsburgh Pirates	PIT	2002	42323599	72	PIT 161
## 362	San Diego Padres	SDN	2002	41425000	66	SDP 162
## 363	Seattle Mariners	SEA	2002	80282668	93	SEA 162
## 364	San Francisco Giants	SFN	2002	78299835	95	SFG 162
## 365	St. Louis Cardinals	SLN	2002	74660875	97	STL 162
## 366	Tampa Bay Rays	TBA	2002	34380000	55	TBD 161
## 367	Texas Rangers	TEX	2002	105526122	72	TEX 162
## 368	Toronto Blue Jays	TOR	2002	76864333	78	TOR 162
## 369	Los Angeles Angels of Anaheim	ANA	2003	79031667	77	ANA 162
## 370	Arizona Diamondbacks	ARI	2003	80657000	84	ARI 162
## 371	Atlanta Braves	ATL	2003	106243667	101	ATL 162
## 372	Baltimore Orioles	BAL	2003	73877500	71	BAL 163
## 373	Boston Red Sox	BOS	2003	99946500	95	BOS 162
## 374	Chicago White Sox	CHA	2003	51010000	86	CHW 162
## 375	Chicago Cubs	CHN	2003	79868333	88	CHC 162
## 376	Cincinnati Reds	CIN	2003	59355667	69	CIN 162
## 377	Cleveland Indians	CLE	2003	48584834	68	CLE 162
## 378	Colorado Rockies	COL	2003	67179667	74	COL 162
## 379	Detroit Tigers	DET	2003	49168000	43	DET 162
## 380	Florida Marlins	FLO	2003	49450000	91	FLA 162
## 381	Houston Astros	HOU	2003	71040000	87	HOU 162
## 382	Kansas City Royals	KCA	2003	40518000	83	KCR 162
## 383	Los Angeles Dodgers	LAN	2003	105572620	85	LAD 162
## 384	Milwaukee Brewers	MIL	2003	40627000	68	MIL 162
## 385	Minnesota Twins	MIN	2003	55505000	90	MIN 162
## 386	Washington Nationals	MON	2003	51948500	83	WSN 162
## 387	New York Yankees	NYA	2003	152749814	101	NYN 163
## 388	New York Mets	NYN	2003	116876429	66	NYM 161
## 389	Oakland Athletics	OAK	2003	50260834	96	OAK 162
## 390	Philadelphia Phillies	PHI	2003	70780000	86	PHI 162

## 391	Pittsburgh Pirates	PIT	2003	54812429	75	PIT 162
## 392	San Diego Padres	SDN	2003	45210000	64	SDP 162
## 393	Seattle Mariners	SEA	2003	86959167	93	SEA 162
## 394	San Francisco Giants	SFN	2003	82852167	100	SFG 161
## 395	St. Louis Cardinals	SLN	2003	83786666	85	STL 162
## 396	Tampa Bay Rays	TBA	2003	19630000	63	TBD 162
## 397	Texas Rangers	TEX	2003	103491667	71	TEX 162
## 398	Toronto Blue Jays	TOR	2003	51269000	86	TOR 162
## 399	Los Angeles Angels of Anaheim	ANA	2004	100534667	92	ANA 162
## 400	Arizona Diamondbacks	ARI	2004	69780750	51	ARI 162
## 401	Atlanta Braves	ATL	2004	90182500	96	ATL 162
## 402	Baltimore Orioles	BAL	2004	51623333	78	BAL 162
## 403	Boston Red Sox	BOS	2004	127298500	98	BOS 162
## 404	Chicago White Sox	CHA	2004	65212500	83	CHW 162
## 405	Chicago Cubs	CHN	2004	90560000	89	CHC 162
## 406	Cincinnati Reds	CIN	2004	46615250	76	CIN 162
## 407	Cleveland Indians	CLE	2004	34319300	80	CLE 162
## 408	Colorado Rockies	COL	2004	65445167	68	COL 162
## 409	Detroit Tigers	DET	2004	46832000	72	DET 162
## 410	Florida Marlins	FLO	2004	42143042	83	FLA 162
## 411	Houston Astros	HOU	2004	75397000	92	HOU 162
## 412	Kansas City Royals	KCA	2004	47609000	58	KCR 162
## 413	Los Angeles Dodgers	LAN	2004	92902001	93	LAD 162
## 414	Milwaukee Brewers	MIL	2004	27528500	67	MIL 161
## 415	Minnesota Twins	MIN	2004	53585000	92	MIN 162
## 416	Washington Nationals	MON	2004	40897500	67	WSN 162
## 417	New York Yankees	NYA	2004	184193950	101	NYN 162
## 418	New York Mets	NYN	2004	96660970	71	NYM 162
## 419	Oakland Athletics	OAK	2004	59425667	91	OAK 162
## 420	Philadelphia Phillies	PHI	2004	92919167	86	PHI 162
## 421	Pittsburgh Pirates	PIT	2004	32227929	72	PIT 161
## 422	San Diego Padres	SDN	2004	55384833	87	SDP 162
## 423	Seattle Mariners	SEA	2004	81515834	63	SEA 162
## 424	San Francisco Giants	SFN	2004	82019166	91	SFG 162
## 425	St. Louis Cardinals	SLN	2004	83228333	105	STL 162
## 426	Tampa Bay Rays	TBA	2004	29556667	70	TBD 161
## 427	Texas Rangers	TEX	2004	55050417	89	TEX 162
## 428	Toronto Blue Jays	TOR	2004	50017000	67	TOR 161
## 429	Arizona Diamondbacks	ARI	2005	62329166	77	ARI 162
## 430	Atlanta Braves	ATL	2005	86457302	90	ATL 162
## 431	Baltimore Orioles	BAL	2005	73914333	74	BAL 162
## 432	Boston Red Sox	BOS	2005	123505125	95	BOS 162
## 433	Chicago White Sox	CHA	2005	75178000	99	CHW 162
## 434	Chicago Cubs	CHN	2005	87032933	79	CHC 162
## 435	Cincinnati Reds	CIN	2005	61892583	73	CIN 163
## 436	Cleveland Indians	CLE	2005	41502500	93	CLE 162
## 437	Colorado Rockies	COL	2005	47839000	67	COL 162
## 438	Detroit Tigers	DET	2005	69092000	71	DET 162
## 439	Florida Marlins	FLO	2005	60408834	83	FLA 162

## 440	Houston Astros	HOU	2005	76779000	89	HOU 163
## 441	Kansas City Royals	KCA	2005	36881000	56	KCR 162
## 442	Los Angeles Angels of Anaheim	LAA	2005	94867822	95	ANA 162
## 443	Los Angeles Dodgers	LAN	2005	83039000	71	LAD 162
## 444	Milwaukee Brewers	MIL	2005	39934833	81	MIL 162
## 445	Minnesota Twins	MIN	2005	56186000	83	MIN 162
## 446	New York Yankees	NYA	2005	208306817	95	NYY 162
## 447	New York Mets	NYN	2005	101305821	83	NYM 162
## 448	Oakland Athletics	OAK	2005	55425762	88	OAK 162
## 449	Philadelphia Phillies	PHI	2005	95522000	88	PHI 162
## 450	Pittsburgh Pirates	PIT	2005	38133000	67	PIT 162
## 451	San Diego Padres	SDN	2005	63290833	82	SDP 162
## 452	Seattle Mariners	SEA	2005	87754334	69	SEA 162
## 453	San Francisco Giants	SFN	2005	90199500	75	SFG 162
## 454	St. Louis Cardinals	SLN	2005	92106833	100	STL 162
## 455	Tampa Bay Rays	TBA	2005	29679067	67	TBD 162
## 456	Texas Rangers	TEX	2005	55849000	79	TEX 162
## 457	Toronto Blue Jays	TOR	2005	45719500	80	TOR 162
## 458	Washington Nationals	WAS	2005	48581500	81	WSN 162
## 459	Arizona Diamondbacks	ARI	2006	59684226	76	ARI 162
## 460	Atlanta Braves	ATL	2006	90156876	79	ATL 162
## 461	Baltimore Orioles	BAL	2006	72585582	70	BAL 162
## 462	Boston Red Sox	BOS	2006	120099824	86	BOS 162
## 463	Chicago White Sox	CHA	2006	102750667	90	CHW 162
## 464	Chicago Cubs	CHN	2006	94424499	66	CHC 162
## 465	Cincinnati Reds	CIN	2006	60909519	80	CIN 162
## 466	Cleveland Indians	CLE	2006	56031500	78	CLE 162
## 467	Colorado Rockies	COL	2006	41233000	76	COL 162
## 468	Detroit Tigers	DET	2006	82612866	95	DET 162
## 469	Florida Marlins	FLO	2006	14671500	78	FLA 162
## 470	Houston Astros	HOU	2006	88694435	82	HOU 162
## 471	Kansas City Royals	KCA	2006	47294000	62	KCR 162
## 472	Los Angeles Angels of Anaheim	LAA	2006	103472000	89	ANA 162
## 473	Los Angeles Dodgers	LAN	2006	98447187	88	LAD 162
## 474	Milwaukee Brewers	MIL	2006	57568333	75	MIL 162
## 475	Minnesota Twins	MIN	2006	63396006	96	MIN 162
## 476	New York Yankees	NYA	2006	194663079	97	NYY 162
## 477	New York Mets	NYN	2006	101084963	97	NYM 162
## 478	Oakland Athletics	OAK	2006	62243079	93	OAK 162
## 479	Philadelphia Phillies	PHI	2006	88273333	85	PHI 162
## 480	Pittsburgh Pirates	PIT	2006	46717750	67	PIT 162
## 481	San Diego Padres	SDN	2006	69896141	88	SDP 162
## 482	Seattle Mariners	SEA	2006	87959833	78	SEA 162
## 483	San Francisco Giants	SFN	2006	90056419	76	SFG 161
## 484	St. Louis Cardinals	SLN	2006	88891371	83	STL 161
## 485	Tampa Bay Rays	TBA	2006	34917967	61	TBD 162
## 486	Texas Rangers	TEX	2006	68228662	80	TEX 162
## 487	Toronto Blue Jays	TOR	2006	71365000	87	TOR 162
## 488	Washington Nationals	WAS	2006	63143000	71	WSN 162

## 489	Arizona Diamondbacks	ARI	2007	52067546	90	ARI 162
## 490	Atlanta Braves	ATL	2007	87290833	84	ATL 162
## 491	Baltimore Orioles	BAL	2007	93174808	69	BAL 162
## 492	Boston Red Sox	BOS	2007	143026214	96	BOS 162
## 493	Chicago White Sox	CHA	2007	108671833	72	CHW 162
## 494	Chicago Cubs	CHN	2007	99670332	85	CHC 162
## 495	Cincinnati Reds	CIN	2007	68524980	72	CIN 162
## 496	Cleveland Indians	CLE	2007	61673267	96	CLE 162
## 497	Colorado Rockies	COL	2007	54041000	90	COL 163
## 498	Detroit Tigers	DET	2007	94800369	88	DET 162
## 499	Florida Marlins	FLO	2007	30507000	71	FLA 162
## 500	Houston Astros	HOU	2007	87759000	73	HOU 162
## 501	Kansas City Royals	KCA	2007	67116500	69	KCR 162
## 502	Los Angeles Angels of Anaheim	LAA	2007	109251333	94	ANA 162
## 503	Los Angeles Dodgers	LAN	2007	108454524	82	LAD 162
## 504	Milwaukee Brewers	MIL	2007	70986500	83	MIL 162
## 505	Minnesota Twins	MIN	2007	71439500	79	MIN 162
## 506	New York Yankees	NYA	2007	189259045	94	NYY 162
## 507	New York Mets	NYN	2007	115231663	88	NYM 162
## 508	Oakland Athletics	OAK	2007	79366940	76	OAK 162
## 509	Philadelphia Phillies	PHI	2007	89428213	89	PHI 162
## 510	Pittsburgh Pirates	PIT	2007	38537833	68	PIT 162
## 511	San Diego Padres	SDN	2007	58110567	89	SDP 163
## 512	Seattle Mariners	SEA	2007	106460833	88	SEA 162
## 513	San Francisco Giants	SFN	2007	90219056	71	SFG 162
## 514	St. Louis Cardinals	SLN	2007	90286823	78	STL 162
## 515	Tampa Bay Rays	TBA	2007	24123500	66	TBD 162
## 516	Texas Rangers	TEX	2007	68318675	75	TEX 162
## 517	Toronto Blue Jays	TOR	2007	81942800	83	TOR 162
## 518	Washington Nationals	WAS	2007	36947500	73	WSN 162
## 519	Arizona Diamondbacks	ARI	2008	66202712	82	ARI 162
## 520	Atlanta Braves	ATL	2008	102365683	72	ATL 162
## 521	Baltimore Orioles	BAL	2008	67196246	68	BAL 161
## 522	Boston Red Sox	BOS	2008	133390035	95	BOS 162
## 523	Chicago White Sox	CHA	2008	121189332	89	CHW 163
## 524	Chicago Cubs	CHN	2008	118345833	97	CHC 161
## 525	Cincinnati Reds	CIN	2008	74117695	74	CIN 162
## 526	Cleveland Indians	CLE	2008	78970066	81	CLE 162
## 527	Colorado Rockies	COL	2008	68655500	74	COL 162
## 528	Detroit Tigers	DET	2008	137685196	74	DET 162
## 529	Florida Marlins	FLO	2008	21811500	84	FLA 161
## 530	Houston Astros	HOU	2008	88930414	86	HOU 161
## 531	Kansas City Royals	KCA	2008	58245500	75	KCR 162
## 532	Los Angeles Angels of Anaheim	LAA	2008	119216333	100	ANA 162
## 533	Los Angeles Dodgers	LAN	2008	118588536	84	LAD 162
## 534	Milwaukee Brewers	MIL	2008	80937499	90	MIL 162
## 535	Minnesota Twins	MIN	2008	56932766	88	MIN 163
## 536	New York Yankees	NYA	2008	207896789	89	NYY 162
## 537	New York Mets	NYN	2008	137793376	89	NYM 162

## 538	Oakland Athletics	OAK	2008	47967126	75	OAK 161
## 539	Philadelphia Phillies	PHI	2008	97879880	92	PHI 162
## 540	Pittsburgh Pirates	PIT	2008	48689783	67	PIT 162
## 541	San Diego Padres	SDN	2008	73677616	63	SDP 162
## 542	Seattle Mariners	SEA	2008	117666482	61	SEA 162
## 543	San Francisco Giants	SFN	2008	76594500	72	SFG 162
## 544	St. Louis Cardinals	SLN	2008	99624449	86	STL 162
## 545	Tampa Bay Rays	TBA	2008	43820597	97	TBD 162
## 546	Texas Rangers	TEX	2008	67712326	79	TEX 162
## 547	Toronto Blue Jays	TOR	2008	97793900	86	TOR 162
## 548	Washington Nationals	WAS	2008	54961000	59	WSN 161
## 549	Arizona Diamondbacks	ARI	2009	73115666	70	ARI 162
## 550	Atlanta Braves	ATL	2009	96726166	86	ATL 162
## 551	Baltimore Orioles	BAL	2009	67101666	64	BAL 162
## 552	Boston Red Sox	BOS	2009	121345999	95	BOS 162
## 553	Chicago White Sox	CHA	2009	96068500	79	CHW 162
## 554	Chicago Cubs	CHN	2009	134809000	83	CHC 161
## 555	Cincinnati Reds	CIN	2009	73558500	78	CIN 162
## 556	Cleveland Indians	CLE	2009	81579166	65	CLE 162
## 557	Colorado Rockies	COL	2009	75201000	92	COL 162
## 558	Detroit Tigers	DET	2009	115085145	86	DET 163
## 559	Florida Marlins	FLO	2009	36834000	87	FLA 162
## 560	Houston Astros	HOU	2009	102996414	74	HOU 162
## 561	Kansas City Royals	KCA	2009	70519333	65	KCR 162
## 562	Los Angeles Angels of Anaheim	LAA	2009	113709000	97	ANA 162
## 563	Los Angeles Dodgers	LAN	2009	100414592	95	LAD 162
## 564	Milwaukee Brewers	MIL	2009	80182502	80	MIL 162
## 565	Minnesota Twins	MIN	2009	65299266	87	MIN 163
## 566	New York Yankees	NYA	2009	201449189	103	NYN 162
## 567	New York Mets	NYN	2009	149373987	70	NYM 162
## 568	Oakland Athletics	OAK	2009	61910000	75	OAK 162
## 569	Philadelphia Phillies	PHI	2009	113004046	93	PHI 162
## 570	Pittsburgh Pirates	PIT	2009	48693000	62	PIT 161
## 571	San Diego Padres	SDN	2009	43333700	75	SDP 162
## 572	Seattle Mariners	SEA	2009	98904166	85	SEA 162
## 573	San Francisco Giants	SFN	2009	83026450	88	SFG 162
## 574	St. Louis Cardinals	SLN	2009	88528409	91	STL 162
## 575	Tampa Bay Rays	TBA	2009	63313034	84	TBD 162
## 576	Texas Rangers	TEX	2009	68178798	87	TEX 162
## 577	Toronto Blue Jays	TOR	2009	80538300	75	TOR 162
## 578	Washington Nationals	WAS	2009	59928000	59	WSN 162
## 579	Arizona Diamondbacks	ARI	2010	60718166	65	ARI 162
## 580	Atlanta Braves	ATL	2010	84423666	91	ATL 162
## 581	Baltimore Orioles	BAL	2010	81612500	66	BAL 162
## 582	Boston Red Sox	BOS	2010	162447333	89	BOS 162
## 583	Chicago White Sox	CHA	2010	105530000	88	CHW 162
## 584	Chicago Cubs	CHN	2010	146609000	75	CHC 162
## 585	Cincinnati Reds	CIN	2010	71761542	91	CIN 162
## 586	Cleveland Indians	CLE	2010	61203966	69	CLE 162

## 587	Colorado Rockies	COL	2010	84227000	83	COL 162
## 588	Detroit Tigers	DET	2010	122864928	81	DET 162
## 589	Florida Marlins	FLO	2010	57029719	80	FLA 162
## 590	Houston Astros	HOU	2010	92355500	76	HOU 162
## 591	Kansas City Royals	KCA	2010	71405210	67	KCR 162
## 592	Los Angeles Angels of Anaheim	LAA	2010	104963866	80	ANA 162
## 593	Los Angeles Dodgers	LAN	2010	95358016	80	LAD 162
## 594	Milwaukee Brewers	MIL	2010	81108278	77	MIL 162
## 595	Minnesota Twins	MIN	2010	97559166	94	MIN 162
## 596	New York Yankees	NYA	2010	206333389	95	NYY 162
## 597	New York Mets	NYN	2010	134422942	79	NYM 162
## 598	Oakland Athletics	OAK	2010	55254900	81	OAK 162
## 599	Philadelphia Phillies	PHI	2010	141928379	97	PHI 162
## 600	Pittsburgh Pirates	PIT	2010	34943000	57	PIT 162
## 601	San Diego Padres	SDN	2010	37799300	90	SDP 162
## 602	Seattle Mariners	SEA	2010	86510000	61	SEA 162
## 603	San Francisco Giants	SFN	2010	98641333	92	SFG 162
## 604	St. Louis Cardinals	SLN	2010	93540751	86	STL 162
## 605	Tampa Bay Rays	TBA	2010	71923471	96	TBD 162
## 606	Texas Rangers	TEX	2010	55250544	90	TEX 162
## 607	Toronto Blue Jays	TOR	2010	62234000	85	TOR 162
## 608	Washington Nationals	WAS	2010	61400000	69	WSN 162
## 609	Arizona Diamondbacks	ARI	2011	53639833	94	ARI 162
## 610	Atlanta Braves	ATL	2011	87002692	89	ATL 162
## 611	Baltimore Orioles	BAL	2011	85304038	69	BAL 162
## 612	Boston Red Sox	BOS	2011	161762475	90	BOS 162
## 613	Chicago White Sox	CHA	2011	127789000	79	CHW 162
## 614	Chicago Cubs	CHN	2011	125047329	71	CHC 162
## 615	Cincinnati Reds	CIN	2011	75947134	79	CIN 162
## 616	Cleveland Indians	CLE	2011	48776566	80	CLE 162
## 617	Colorado Rockies	COL	2011	88148071	73	COL 162
## 618	Detroit Tigers	DET	2011	105700231	95	DET 162
## 619	Florida Marlins	FLO	2011	56944000	72	FLA 162
## 620	Houston Astros	HOU	2011	70694000	56	HOU 162
## 621	Kansas City Royals	KCA	2011	35712000	71	KCR 162
## 622	Los Angeles Angels of Anaheim	LAA	2011	138543166	86	ANA 162
## 623	Los Angeles Dodgers	LAN	2011	104188999	82	LAD 161
## 624	Milwaukee Brewers	MIL	2011	85497333	96	MIL 162
## 625	Minnesota Twins	MIN	2011	112737000	63	MIN 162
## 626	New York Yankees	NYA	2011	202275028	97	NYY 162
## 627	New York Mets	NYN	2011	118847309	77	NYM 162
## 628	Oakland Athletics	OAK	2011	66536500	74	OAK 162
## 629	Philadelphia Phillies	PHI	2011	172976379	102	PHI 162
## 630	Pittsburgh Pirates	PIT	2011	45047000	72	PIT 162
## 631	San Diego Padres	SDN	2011	45869140	71	SDP 162
## 632	Seattle Mariners	SEA	2011	86110600	67	SEA 162
## 633	San Francisco Giants	SFN	2011	118198333	86	SFG 162
## 634	St. Louis Cardinals	SLN	2011	105433572	90	STL 162
## 635	Tampa Bay Rays	TBA	2011	41053571	91	TBD 162

## 636	Texas Rangers	TEX	2011	92299264	96	TEX 162
## 637	Toronto Blue Jays	TOR	2011	62567800	81	TOR 162
## 638	Washington Nationals	WAS	2011	63856928	80	WSN 161
## 639	Arizona Diamondbacks	ARI	2012	73804833	81	ARI 162
## 640	Atlanta Braves	ATL	2012	82829942	94	ATL 162
## 641	Baltimore Orioles	BAL	2012	77353999	93	BAL 162
## 642	Boston Red Sox	BOS	2012	173186617	69	BOS 162
## 643	Chicago White Sox	CHA	2012	96919500	85	CHW 162
## 644	Chicago Cubs	CHN	2012	88197033	61	CHC 162
## 645	Cincinnati Reds	CIN	2012	82203616	97	CIN 162
## 646	Cleveland Indians	CLE	2012	78430300	68	CLE 162
## 647	Colorado Rockies	COL	2012	78069571	64	COL 162
## 648	Detroit Tigers	DET	2012	132300000	88	DET 162
## 649	Houston Astros	HOU	2012	60651000	55	HOU 162
## 650	Kansas City Royals	KCA	2012	60916225	72	KCR 162
## 651	Los Angeles Angels of Anaheim	LAA	2012	154485166	89	ANA 162
## 652	Los Angeles Dodgers	LAN	2012	95143575	86	LAD 162
## 653	Florida Marlins	MIA	2012	118078000	69	FLA 162
## 654	Milwaukee Brewers	MIL	2012	97653944	83	MIL 162
## 655	Minnesota Twins	MIN	2012	94085000	66	MIN 162
## 656	New York Yankees	NYA	2012	196522289	95	NYN 162
## 657	New York Mets	NYN	2012	93353983	74	NYM 162
## 658	Oakland Athletics	OAK	2012	55372500	94	OAK 162
## 659	Philadelphia Phillies	PHI	2012	174538938	81	PHI 162
## 660	Pittsburgh Pirates	PIT	2012	62951999	79	PIT 162
## 661	San Diego Padres	SDN	2012	55244700	76	SDP 162
## 662	Seattle Mariners	SEA	2012	81978100	75	SEA 162
## 663	San Francisco Giants	SFN	2012	117620683	94	SFG 162
## 664	St. Louis Cardinals	SLN	2012	110300862	88	STL 162
## 665	Tampa Bay Rays	TBA	2012	64173500	90	TBD 162
## 666	Texas Rangers	TEX	2012	120510974	93	TEX 162
## 667	Toronto Blue Jays	TOR	2012	75009200	73	TOR 162
## 668	Washington Nationals	WAS	2012	80855143	98	WSN 162
## 669	Arizona Diamondbacks	ARI	2013	90132000	81	ARI 162
## 670	Atlanta Braves	ATL	2013	87871525	96	ATL 162
## 671	Baltimore Orioles	BAL	2013	84393333	85	BAL 162
## 672	Boston Red Sox	BOS	2013	151530000	97	BOS 162
## 673	Chicago White Sox	CHA	2013	120065277	63	CHW 162
## 674	Chicago Cubs	CHN	2013	100567726	66	CHC 162
## 675	Cincinnati Reds	CIN	2013	106404462	90	CIN 162
## 676	Cleveland Indians	CLE	2013	75771800	92	CLE 162
## 677	Colorado Rockies	COL	2013	74409071	74	COL 162
## 678	Detroit Tigers	DET	2013	145989500	93	DET 162
## 679	Houston Astros	HOU	2013	17890700	51	HOU 162
## 680	Kansas City Royals	KCA	2013	80091725	86	KCR 162
## 681	Los Angeles Angels of Anaheim	LAA	2013	124174750	78	ANA 162
## 682	Los Angeles Dodgers	LAN	2013	223362196	92	LAD 162
## 683	Florida Marlins	MIA	2013	33601900	62	FLA 162
## 684	Milwaukee Brewers	MIL	2013	76947033	74	MIL 162

## 685	Minnesota Twins	MIN	2013	75337500	66	MIN 162
## 686	New York Yankees	NYA	2013	231978886	85	NYN 162
## 687	New York Mets	NYN	2013	49448346	74	NYM 162
## 688	Oakland Athletics	OAK	2013	60132500	96	OAK 162
## 689	Philadelphia Phillies	PHI	2013	169863189	73	PHI 162
## 690	Pittsburgh Pirates	PIT	2013	77062000	94	PIT 162
## 691	San Diego Padres	SDN	2013	65585500	76	SDP 162
## 692	Seattle Mariners	SEA	2013	74005043	71	SEA 162
## 693	San Francisco Giants	SFN	2013	140180334	76	SFG 162
## 694	St. Louis Cardinals	SLN	2013	92260110	97	STL 162
## 695	Tampa Bay Rays	TBA	2013	52955272	92	TBD 163
## 696	Texas Rangers	TEX	2013	112522600	91	TEX 163
## 697	Toronto Blue Jays	TOR	2013	126288100	74	TOR 162
## 698	Washington Nationals	WAS	2013	113703270	86	WSN 162
## 699	Arizona Diamondbacks	ARI	2014	97861500	64	ARI 162
## 700	Atlanta Braves	ATL	2014	97609000	79	ATL 162
## 701	Baltimore Orioles	BAL	2014	103416000	96	BAL 162
## 702	Boston Red Sox	BOS	2014	139019929	71	BOS 162
## 703	Chicago White Sox	CHA	2014	81830500	73	CHW 162
## 704	Chicago Cubs	CHN	2014	65522500	73	CHC 162
## 705	Cincinnati Reds	CIN	2014	108217500	76	CIN 162
## 706	Cleveland Indians	CLE	2014	77651899	85	CLE 162
## 707	Colorado Rockies	COL	2014	95403500	66	COL 162
## 708	Detroit Tigers	DET	2014	152855500	90	DET 162
## 709	Houston Astros	HOU	2014	35116300	70	HOU 162
## 710	Kansas City Royals	KCA	2014	74594075	89	KCR 162
## 711	Los Angeles Angels of Anaheim	LAA	2014	121988250	98	ANA 162
## 712	Los Angeles Dodgers	LAN	2014	217014600	94	LAD 162
## 713	Florida Marlins	MIA	2014	41836900	77	FLA 162
## 714	Milwaukee Brewers	MIL	2014	101217000	82	MIL 162
## 715	Minnesota Twins	MIN	2014	83762500	70	MIN 162
## 716	New York Yankees	NYA	2014	197543907	84	NYN 162
## 717	New York Mets	NYN	2014	85556990	79	NYM 162
## 718	Oakland Athletics	OAK	2014	72408400	88	OAK 162
## 719	Philadelphia Phillies	PHI	2014	180944967	73	PHI 162
## 720	Pittsburgh Pirates	PIT	2014	77178000	88	PIT 162
## 721	San Diego Padres	SDN	2014	75685700	77	SDP 162
## 722	Seattle Mariners	SEA	2014	92531100	87	SEA 162
## 723	San Francisco Giants	SFN	2014	163510167	88	SFG 162
## 724	St. Louis Cardinals	SLN	2014	120693000	90	STL 162
## 725	Tampa Bay Rays	TBA	2014	72689100	77	TBD 162
## 726	Texas Rangers	TEX	2014	112255059	67	TEX 162
## 727	Toronto Blue Jays	TOR	2014	109920100	83	TOR 162
## 728	Washington Nationals	WAS	2014	131983680	96	WSN 162
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## 1	40.12346					
## 2	47.20497					
## 3	54.32099					
## 4	49.38272					

## 5	58.02469
## 6	47.53086
## 7	56.17284
## 8	47.53086
## 9	48.76543
## 10	46.29630
## 11	46.58385
## 12	53.08642
## 13	45.67901
## 14	45.67901
## 15	52.46914
## 16	41.35802
## 17	56.17284
## 18	63.58025
## 19	47.53086
## 20	58.64198
## 21	46.29630
## 22	47.53086
## 23	52.46914
## 24	43.20988
## 25	51.23457
## 26	53.08642
## 27	58.02469
## 28	41.35802
## 29	51.85185
## 30	50.00000
## 31	53.70370
## 32	48.12500
## 33	45.67901
## 34	35.18519
## 35	51.85185
## 36	40.12346
## 37	50.61728
## 38	57.40741
## 39	58.64198
## 40	51.23457
## 41	44.09938
## 42	43.82716
## 43	47.82609
## 44	51.85185
## 45	48.14815
## 46	60.49383
## 47	51.85185
## 48	51.23457
## 49	46.29630
## 50	51.85185
## 51	52.46914
## 52	56.17284
## 53	60.49383

## 54	54.93827
## 55	45.06173
## 56	44.44444
## 57	53.08642
## 58	48.14815
## 59	55.55556
## 60	46.91358
## 61	46.29630
## 62	50.00000
## 63	44.44444
## 64	38.88889
## 65	55.55556
## 66	56.79012
## 67	53.70370
## 68	46.91358
## 69	44.44444
## 70	59.25926
## 71	43.20988
## 72	59.25926
## 73	50.61728
## 74	39.50617
## 75	44.44444
## 76	51.23457
## 77	47.53086
## 78	59.25926
## 79	64.19753
## 80	52.46914
## 81	49.38272
## 82	43.82716
## 83	58.02469
## 84	51.53374
## 85	45.06173
## 86	46.91358
## 87	41.35802
## 88	52.46914
## 89	39.50617
## 90	52.46914
## 91	51.85185
## 92	50.00000
## 93	43.82716
## 94	42.59259
## 95	57.66871
## 96	54.32099
## 97	36.41975
## 98	41.97531
## 99	59.87654
## 100	46.29630
## 101	37.65432
## 102	50.61728

## 103	63.58025
## 104	53.70370
## 105	53.08642
## 106	58.64198
## 107	59.64912
## 108	56.25000
## 109	46.95652
## 110	40.86957
## 111	59.29204
## 112	43.36283
## 113	57.39130
## 114	58.40708
## 115	45.29915
## 116	46.08696
## 117	44.34783
## 118	57.39130
## 119	55.65217
## 120	50.87719
## 121	46.90265
## 122	46.08696
## 123	64.91228
## 124	61.94690
## 125	48.67257
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## 127	46.95652
## 128	46.49123
## 129	40.17094
## 130	43.75000
## 131	47.82609
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## 133	45.61404
## 134	47.82609
## 135	62.50000
## 136	49.30556
## 137	59.72222
## 138	53.79310
## 139	46.89655
## 140	50.69444
## 141	59.02778
## 142	69.44444
## 143	53.47222
## 144	41.66667
## 145	46.85315
## 146	52.77778
## 147	48.61111
## 148	54.16667
## 149	38.88889
## 150	45.13889
## 151	45.83333

## 152	54.48276
## 153	47.91667
## 154	46.52778
## 155	47.91667
## 156	40.27778
## 157	48.61111
## 158	54.48276
## 159	46.52778
## 160	43.35664
## 161	51.38889
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## 163	59.25926
## 164	53.98773
## 165	52.46914
## 166	43.47826
## 167	52.46914
## 168	46.91358
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## 170	61.49068
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## 174	50.61728
## 175	46.58385
## 176	55.55556
## 177	48.14815
## 178	49.38272
## 179	54.32099
## 180	56.79012
## 181	43.82716
## 182	48.14815
## 183	41.35802
## 184	45.06173
## 185	56.17284
## 186	52.79503
## 187	41.97531
## 188	54.32099
## 189	55.21472
## 190	45.67901
## 191	51.85185
## 192	62.34568
## 193	60.49383
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## 195	49.68944
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## 197	46.91358
## 198	53.41615
## 199	51.23457
## 200	48.76543

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## 204	54.32099
## 205	41.97531
## 206	48.44720
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## 208	59.25926
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## 210	40.12346
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## 212	48.76543
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## 214	55.55556
## 215	55.55556
## 216	45.06173
## 217	47.53086
## 218	46.91358
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## 220	40.12346
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## 224	49.07975
## 225	55.21472
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## 227	54.93827
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## 239	45.67901
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## 247	54.32099
## 248	53.98773
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## 269	53.70370
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## 278	51.85185
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## 317	56.17284
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## 522	58.64198
## 523	54.60123
## 524	60.24845
## 525	45.67901
## 526	50.00000
## 527	45.67901
## 528	45.67901
## 529	52.17391
## 530	53.41615
## 531	46.29630
## 532	61.72840
## 533	51.85185
## 534	55.55556
## 535	53.98773
## 536	54.93827
## 537	54.93827
## 538	46.58385
## 539	56.79012
## 540	41.35802
## 541	38.88889
## 542	37.65432
## 543	44.44444

## 544	53.08642
## 545	59.87654
## 546	48.76543
## 547	53.08642
## 548	36.64596
## 549	43.20988
## 550	53.08642
## 551	39.50617
## 552	58.64198
## 553	48.76543
## 554	51.55280
## 555	48.14815
## 556	40.12346
## 557	56.79012
## 558	52.76074
## 559	53.70370
## 560	45.67901
## 561	40.12346
## 562	59.87654
## 563	58.64198
## 564	49.38272
## 565	53.37423
## 566	63.58025
## 567	43.20988
## 568	46.29630
## 569	57.40741
## 570	38.50932
## 571	46.29630
## 572	52.46914
## 573	54.32099
## 574	56.17284
## 575	51.85185
## 576	53.70370
## 577	46.29630
## 578	36.41975
## 579	40.12346
## 580	56.17284
## 581	40.74074
## 582	54.93827
## 583	54.32099
## 584	46.29630
## 585	56.17284
## 586	42.59259
## 587	51.23457
## 588	50.00000
## 589	49.38272
## 590	46.91358
## 591	41.35802
## 592	49.38272

## 593	49.38272
## 594	47.53086
## 595	58.02469
## 596	58.64198
## 597	48.76543
## 598	50.00000
## 599	59.87654
## 600	35.18519
## 601	55.55556
## 602	37.65432
## 603	56.79012
## 604	53.08642
## 605	59.25926
## 606	55.55556
## 607	52.46914
## 608	42.59259
## 609	58.02469
## 610	54.93827
## 611	42.59259
## 612	55.55556
## 613	48.76543
## 614	43.82716
## 615	48.76543
## 616	49.38272
## 617	45.06173
## 618	58.64198
## 619	44.44444
## 620	34.56790
## 621	43.82716
## 622	53.08642
## 623	50.93168
## 624	59.25926
## 625	38.88889
## 626	59.87654
## 627	47.53086
## 628	45.67901
## 629	62.96296
## 630	44.44444
## 631	43.82716
## 632	41.35802
## 633	53.08642
## 634	55.55556
## 635	56.17284
## 636	59.25926
## 637	50.00000
## 638	49.68944
## 639	50.00000
## 640	58.02469
## 641	57.40741

## 642	42.59259
## 643	52.46914
## 644	37.65432
## 645	59.87654
## 646	41.97531
## 647	39.50617
## 648	54.32099
## 649	33.95062
## 650	44.44444
## 651	54.93827
## 652	53.08642
## 653	42.59259
## 654	51.23457
## 655	40.74074
## 656	58.64198
## 657	45.67901
## 658	58.02469
## 659	50.00000
## 660	48.76543
## 661	46.91358
## 662	46.29630
## 663	58.02469
## 664	54.32099
## 665	55.55556
## 666	57.40741
## 667	45.06173
## 668	60.49383
## 669	50.00000
## 670	59.25926
## 671	52.46914
## 672	59.87654
## 673	38.88889
## 674	40.74074
## 675	55.55556
## 676	56.79012
## 677	45.67901
## 678	57.40741
## 679	31.48148
## 680	53.08642
## 681	48.14815
## 682	56.79012
## 683	38.27160
## 684	45.67901
## 685	40.74074
## 686	52.46914
## 687	45.67901
## 688	59.25926
## 689	45.06173
## 690	58.02469

```
## 691      46.91358
## 692      43.82716
## 693      46.91358
## 694      59.87654
## 695      56.44172
## 696      55.82822
## 697      45.67901
## 698      53.08642
## 699      39.50617
## 700      48.76543
## 701      59.25926
## 702      43.82716
## 703      45.06173
## 704      45.06173
## 705      46.91358
## 706      52.46914
## 707      40.74074
## 708      55.55556
## 709      43.20988
## 710      54.93827
## 711      60.49383
## 712      58.02469
## 713      47.53086
## 714      50.61728
## 715      43.20988
## 716      51.85185
## 717      48.76543
## 718      54.32099
## 719      45.06173
## 720      54.32099
## 721      47.53086
## 722      53.70370
## 723      54.32099
## 724      55.55556
## 725      47.53086
## 726      41.35802
## 727      51.23457
## 728      59.25926
```

Q4.) Question 2 and 3 deal with win percentage as a function of payroll while for this function, we have efficiency as a function of year. In this plot we are also able to see how a team's efficiency changes over the years(purpose of a line plot). From this plot we are also able to see the spike that Oakland had during the moneyball period in terms of efficiency, warranting the creation of the movie.

```

efficiency <- payroll_df %>%
  filter(teamID == "OAK" | teamID == "NYA" | teamID == "BOS" | teamID == "ATL" | teamID == "TBA") %>%
  group_by(yearID) %>%
  mutate(avg_year = mean(Payroll)) %>%
  mutate(standardized = ((Payroll - avg_year)/sd(Payroll))) %>%
  mutate(expected_wp = (50 + 2.5 * (standardized))) %>%
  mutate(efficiency = Win_percentage - expected_wp) %>%
  group_by(teamID) %>%
  ggplot(aes(x = yearID, y = efficiency, color = factor(teamID))) + geom_point() + geom_smooth()
  m_text(aes(label = teamID)) +
  labs(title = "Efficiency of Select Teams over Years", x = "Year", y = "Efficiency",
        color = "Teams") + geom_smooth()

efficiency

```

```
## `geom_smooth()` using method = 'loess'
```

Efficiency of Select Teams over Years

