

## **BASEBALL PLAYERS LABOR MARKET**

### **Coase Theorem.**

In the absence of significant transactions cost (few parties), any asset (talent) will be used in its most efficient manner (highest marginal revenue product), regardless of ownership (reserve/transfer system or free agency.)

### **Invariance proposition.**

"A market in which freedom is limited by a reserve rule...distributes players about as a free market would."

"No matter who owns the right to sell the contract for the services of a baseball player, the distribution of players among teams will remain the same."

### **Yankee Paradox.**

Self-defeating dominance of the league would be internalized by the large market club.

### **Exploitation.**

If competitive balance is unaffected by ownership then the only purpose of the reserve rule and other limitations of the labor market is to transfer rent from players to owners.

### **Player development expense PDX.**

If teams cannot recover player development costs, then the player development system in the minor leagues would cease to exist and the quality of play will be reduced. Players are exploited to the extent that they are paid less than their marginal revenue product after player development expenses.

### **Marginal revenue product.**

In a competitive market a player will be paid the value of his marginal revenue product. The marginal revenue product of talent is equal to the marginal product of talent multiplied by a team's marginal revenue of winning. In a monopsony market a player's salary will approach his opportunity cost (reservation wage) at the limit.

### **Strong form invariance.**

The distribution of playing talent will not be affected by any rules limiting labor market mobility. These rules (player draft, roster limits, salary caps, revenue sharing) serve only to exploit playing talent by depressing wages.

### **How to break up the Yankees.**

The only solution is to increase competition (reduce monopoly power) in the product market where the large market club enjoys its revenue advantage. This solution uses the power of competition in the product market rather than further limiting competition in the labor market (by *increasing* monopsony power).

MAJOR LEAGUE BASEBALL SELECTED PLAYER CONTRACTS													
JOSH HAMILTON: 5 years/\$125M (2013-17)							MIKE TROUT: 6 years/\$144.5M (2015-20)						
Year	Age	Team	G	Salary	WAR	\$M/WAR	Year	Age	Team	G	Salary	WAR	\$M/WAR
2007	26	Cincinnati Reds	90	\$380,000	2.5	\$0.15	2011	19	Los Angeles Angels	40	\$414,000	0.7	\$0.59
2008	27	Texas Rangers	156	\$396,830	5.4	\$0.07	2012	20	Los Angeles Angels	139	\$480,000	10.8	\$0.04
2009	28	Texas Rangers	89	\$555,000	0.6	\$0.93	2013	21	Los Angeles Angels	157	\$510,000	8.9	\$0.06
2010	29	Texas Rangers	133	\$3,250,000	8.7	\$0.37	2014	22	Los Angeles Angels	157	\$1,000,000	7.9	\$0.13
2011	30	Texas Rangers	121	\$8,750,000	3.7	\$2.36	2015	23	Los Angeles Angels		\$5,250,000	7.5	\$0.70
2012	31	Texas Rangers	148	\$13,750,000	3.9	\$3.53	2016	24	Los Angeles Angels		\$15,250,000		
2013	32	Los Angeles Angels	151	\$17,000,000	1.5	\$11.33	2017	25	Los Angeles Angels		\$19,250,000		
2014	33	Los Angeles Angels	89	\$17,000,000	1.4	\$12.14	2018	26	Los Angeles Angels		\$33,250,000		
2015	34	Los Angeles Angels	39	\$25,400,000		\$20,710,000	2019	27	Los Angeles Angels		\$33,250,000		
2016	35	Texas Rangers		\$28,410,000		\$26,410,000	2020	28	Los Angeles Angels		\$33,250,000		
2017	36	Texas Rangers		\$28,410,000		\$26,410,000							
CARLOS BELTRAN: 3 years/\$45M (2014-16)							CC SABATHIA: 5 years/\$122M (2012-16), plus 2017 option						
Year	Age	Team	G	Salary	WAR	\$M/WAR	Year	Age	Team	G	Salary	WAR	\$M/WAR
1998	21	Kansas City Royals	14	\$170,000	0.3	\$0.57	2001	20	Cleveland Indians	33	\$200,000	2.9	\$0.07
1999	22	Kansas City Royals	156	\$200,000	4.7	\$0.04	2002	21	Cleveland Indians	33	\$700,000	3.2	\$0.22
2000	23	Kansas City Royals	98	\$350,000	0.8	\$0.44	2003	22	Cleveland Indians	30	\$1,100,000	3.7	\$0.30
2001	24	Kansas City Royals	155	\$425,000	6.4	\$0.07	2004	23	Cleveland Indians	30	\$2,700,000	3	\$0.90
2002	25	Kansas City Royals	162	\$3,500,000	4.3	\$0.81	2005	24	Cleveland Indians	31	\$5,250,000	1.8	\$2.92
2003	26	Kansas City Royals	141	\$6,000,000	5.8	\$1.03	2006	25	Cleveland Indians	28	\$7,000,000	4.6	\$1.52
2004	27	Kansas City Royals	69	\$9,000,000	2.3	\$1.32	2007	26	Cleveland Indians	34	\$8,750,000	6.3	\$1.39
2004		HOU: Trade	90		4.5	\$1.32	2008	27	Cleveland Indians	18	\$11,000,000	1.9	\$1.62
2005	28	New York Mets	151	\$11,571,429	2.9	\$3.99	2008		MIL: Trade	17		4.9	\$1.62
2006	29	New York Mets	140	\$13,571,428	8.2	\$1.66	2009	28	New York Yankees	34	\$15,285,714	6.2	\$2.47
2007	30	New York Mets	144	\$13,571,429	5.4	\$2.51	2010	29	New York Yankees	34	\$24,285,714	4.6	\$5.28
2008	31	New York Mets	161	\$18,622,809	6.9	\$2.70	2011	30	New York Yankees	33	\$24,285,714	7.5	\$3.24
2009	32	New York Mets	81	\$19,243,682	3.6	\$5.35	2012	31	New York Yankees	28	\$23,000,000	3.5	\$6.57
2010	33	New York Mets	64	\$19,401,569	0.7	\$27.72	2013	32	New York Yankees	32	\$23,000,000	0.3	\$76.67
2011	34	New York Mets	98	\$19,325,436	3.6	\$4.20	2014	33	New York Yankees	8	\$23,000,000	-0.6	-\$38.33
2011		SFG: Trade	44		1.0	\$4.20	2015	34	New York Yankees		\$23,000,000	0.3	\$76.67
2012	35	St. Louis Cardinals	151	\$13,000,000	3.9	\$3.33	2016	35	New York Yankees		\$25,000,000		
2013	36	St. Louis Cardinals	145	\$13,000,000	2.4	\$5.42	2017	36	New York Yankees		\$25,000,000		
2014	37	New York Yankees	109	\$15,000,000	-0.2	-\$75.00							
2015	38	New York Yankees		\$15,000,000	0.8	\$18.75							
2016	39	New York Yankees		\$15,000,000									
CLAYTON KERSHAW: 7 years/\$215M (2014-20)							BUSTER POSEY: 9 years/\$167M (2013-21), plus 2022 team option						
Year	Age	Team	G	Salary	WAR	\$M/WAR	Year	Age	Team	G	Salary	WAR	\$M/WAR
2008	20	Los Angeles Dodgers	22	\$390,000	1.4	\$0.28	2009	22	San Francisco Giants	7	\$400,000	-0.1	-\$4.00
2009	21	Los Angeles Dodgers	31	\$404,000	4.7	\$0.09	2010	23	San Francisco Giants	108	\$400,000	3.9	\$0.10
2010	22	Los Angeles Dodgers	32	\$440,000	5.5	\$0.08	2011	24	San Francisco Giants	45	\$575,000	1.4	\$0.41
2011	23	Los Angeles Dodgers	33	\$500,000	6.5	\$0.08	2012	25	San Francisco Giants	148	\$615,000	7.3	\$0.08
2012	24	Los Angeles Dodgers	33	\$8,000,000	6.2	\$1.29	2013	26	San Francisco Giants	148	\$8,000,000	4.9	\$1.63
2013	25	Los Angeles Dodgers	33	\$11,000,000	7.8	\$1.41	2014	27	San Francisco Giants	147	\$12,500,000	5.3	\$2.36
2014	26	Los Angeles Dodgers	27	\$22,000,000	7.5	\$2.93	2015	28	San Francisco Giants		\$16,500,000	5.4	\$3.06
2015	27	Los Angeles Dodgers		\$30,000,000	6.3	\$3.49	2016	29	San Francisco Giants		\$20,000,000		
2016	28	Los Angeles Dodgers		\$32,000,000			2017	30	San Francisco Giants		\$21,400,000		
2017	29	Los Angeles Dodgers		\$33,000,000			2018	31	San Francisco Giants		\$21,400,000		
2018	30	Los Angeles Dodgers		\$33,000,000	Player option		2019	32	San Francisco Giants		\$21,400,000		
2019	31	Los Angeles Dodgers		\$32,000,000			2020	33	San Francisco Giants		\$21,400,000		
2020	32	Los Angeles Dodgers		\$33,000,000			2021	34	San Francisco Giants		\$21,400,000		
							2022	35	San Francisco Giants		\$22,000,000	Team option (\$3M)	

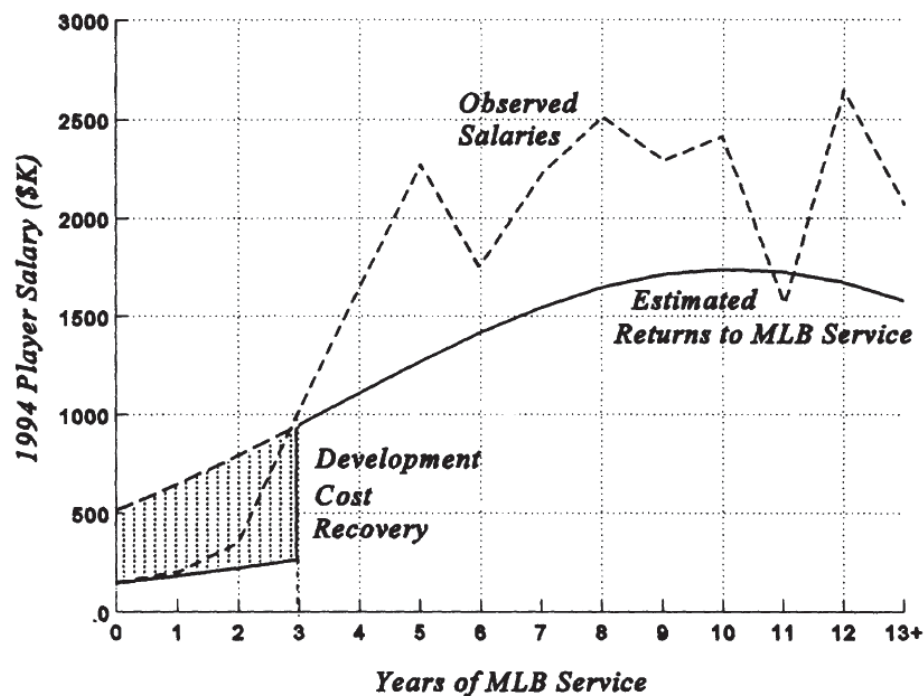
**Table IV.** Average Major League Salaries Segmented by Service Class 1984, 1990 and 1994

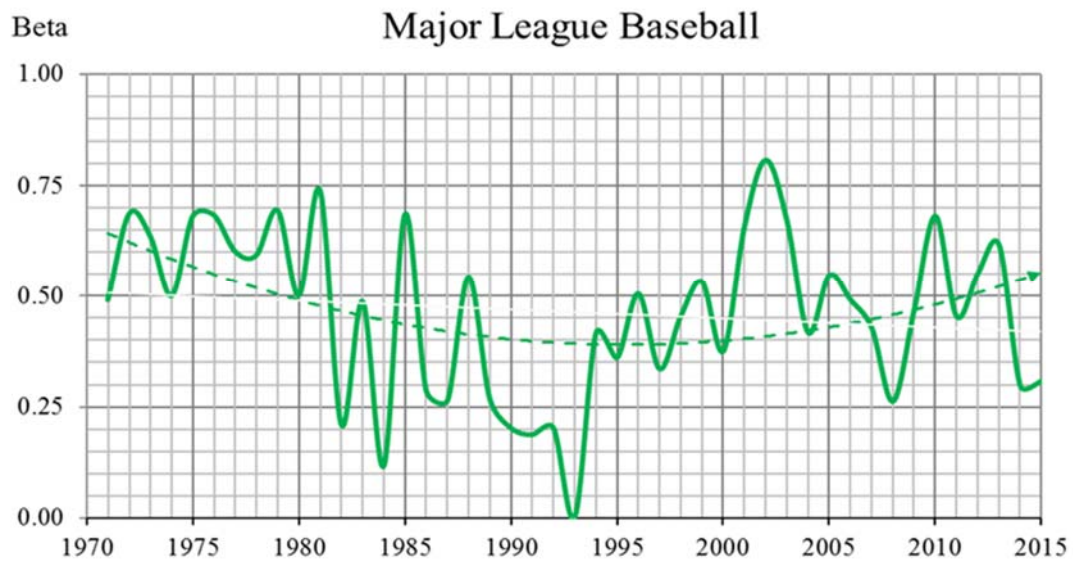
MLB Service Years	Number of Players			Cumulative Distribution of Players (percent)			Mean Player Salary (\$ thousands)			Annual Salary Increase (percent)	
	1984	1990	1994	1984	1990	1994	1984	1990	1994	1984-90	1990-94
0	158	172	134	21.7	23.4	18.0	51.9	108.4	126.9	18.1	4.3
1	83	90	105	33.1	35.6	32.0	103.2	154.7	207.7	8.3	8.6
2*	69	68	71	42.5	44.9	41.6	200.3	262.8	344.1	5.2	7.7
3*	57	67	75	50.3	54.0	51.6	310.1	593.0	1019.9	15.2	17.8
4	51	66	64	57.3	63.0	60.2	412.1	760.2	1594.5	14.1	27.4
5	45	55	53	63.5	70.5	67.3	422.5	1018.1	2281.4	23.5	31.0
6	44	43	45	69.5	76.3	73.3	536.7	1047.7	1741.6	15.9	16.5
7	37	47	50	74.6	82.7	80.0	562.1	956.5	2214.8	11.7	32.9
8	37	29	33	79.7	86.7	84.5	472.9	1191.4	2508.0	25.3	27.6
9	31	20	31	84.0	89.4	88.6	607.7	1280.5	2296.3	18.5	19.8
10	27	15	19	87.7	91.4	91.2	570.5	1230.0	2417.1	19.3	24.1
11	25	14	22	91.1	93.3	94.1	618.8	920.9	1555.5	8.1	17.2
12	22	18	13	94.1	95.8	95.8	512.6	1320.3	2638.5	26.3	24.7
13+	43	31	33	100.0	100.0	100.0	673.2	1327.9	2064.4	16.2	13.9
Totals	729	735	746				329.4	597.5	1188.7	13.6	24.7

\*Second year players were eligible for arbitration in 1984. The top 17 percent of second year players (14 players in 1994 with 2.13 years service) are eligible for arbitration and included in third year 1994 data.

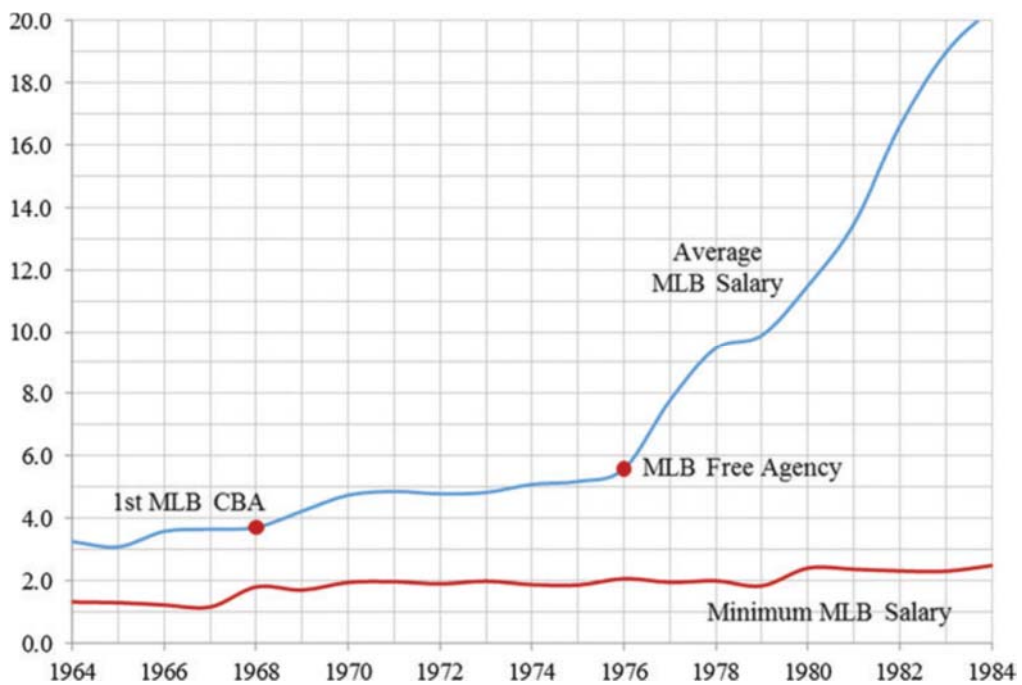
Sources: Major League Baseball Players' Association and *Baseball America* [5].

#### THE BASEBALL PLAYERS' LABOR MARKET RECONSIDERED

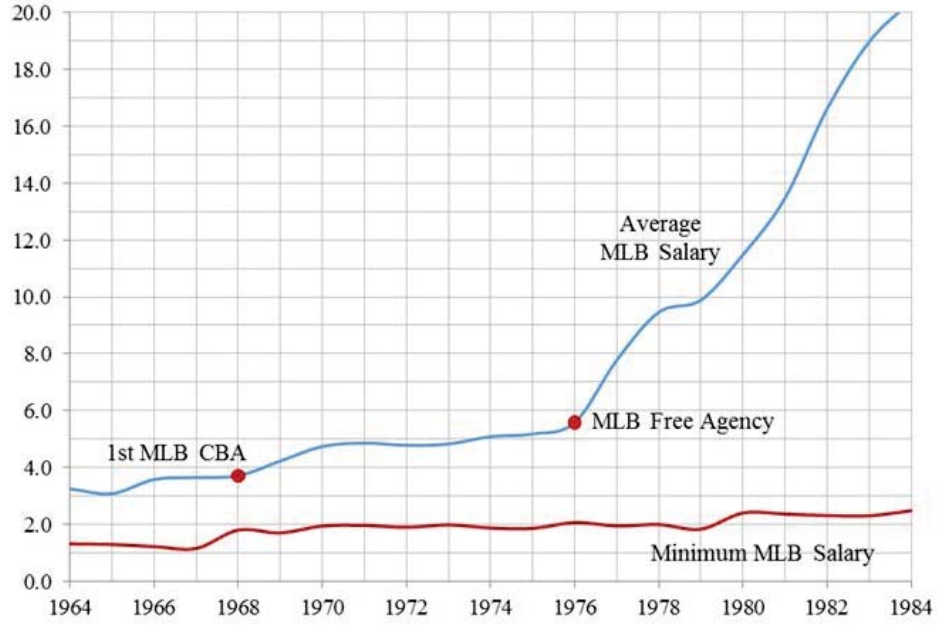




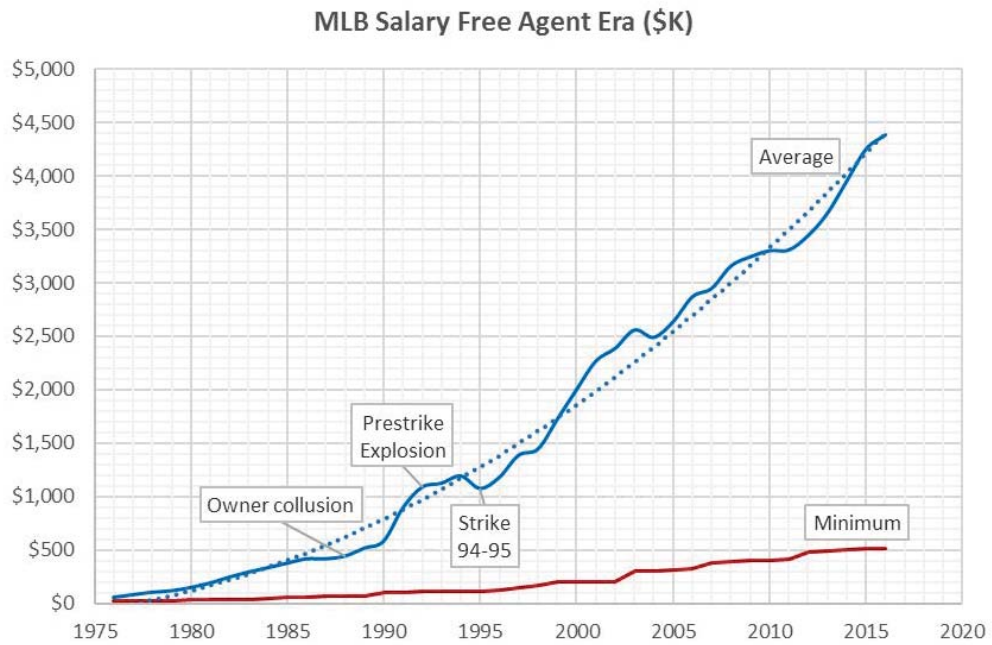
**Competitive Balance before and after Free Agency in 1976**



**MLB Player Salaries before and after Free Agency in 1976**



MLB Player Salaries Indexed to National Average Wage 1964-84



*How to determine the marginal revenue product of talent MRP.*

$$\pi_1 = R_1 - C_1$$

$$\pi_1 = R_1 [ m_1, w_1( t_1, t_2 ) ] - ct_1$$

$$MRP_1 = (\partial R_1 / \partial t_1) = (\partial R_1 / \partial w_1)(\partial w_1 / \partial t_1) = MR_1 MP_1 = c$$

$\pi_1$  = profit for team 1

$R_1$  = team revenue which is a function of market size  $m_1$  and win percent  $w_1$

$w_1 = w( t_1 )$  = win percent which is a function of relative talent  $w_1 = t_1 / (t_1 + t_2)$

$C_1 = ct_1$  = payroll where  $c$  = cost per unit of talent

$$MRP_1 = MR_1 MP_1$$

*MRP is the product of the marginal revenue of a win MR and the marginal product of talent MP where both are assumed to have diminishing marginal returns.*

MRP AMBIGUITY AND PLAYER MOVEMENT		
MRP=MR*MP	MID-MARKET LOW MR	LARGE MARKET HIGH MR
GOOD TEAM LOW MP	HOUSTON ASTROS 04 (CARLOS BELTRAN WAR=4.5)	NY YANKEES 13 (ROBINSON CANO WAR =5.0)
		NY YANKEES 04 (ALEX RODRIGUEZ WAR=5.3)
BAD TEAM HIGH MP	SEATTLE MARINERS 14 (ROBINSON CANO WAR =6.4)	NY METS 05 (CARLOS BELTRAN WAR=4.4)
	TEXAS RANGERS 03 (ALEX RODRIGUEZ WAR = 8.5)	

## Vrooman Salary Analysis: C.C. Sabathia 2008

Base salary \$9 million  
 Cy Young Raise \$2 million  
 Total Salary 2008 \$11 million

				Traded July 7 2008		
2008 Season	W-L	ERA	IP	Split %	Games	Split %
Cleveland AL	6-8	3.83	122	48.6%	89	54.9%
Milwaukee NL	11-2	1.65	130	51.4%	73	45.1%
2008 Total	17-10	2.70	253	100.0%	162	100.0%
Brewers Win %	W-L	2008				
With Sabathia	90-72	0.556				
Without Sabathia	79-70	0.530				
Extra Win %		0.026				

Milwaukee Estimated Attendance Multiple since 1998 (NL) = 5 million \* win%  
 Brewers extra attendance from Sabathia: ATT = 129,220 = 5 million \* .026

Brewers 2008 total revenue multiple per fan = \$60 (guesstimate): VTS = 34%  
 Brewers 2008 local revenue multiple per fan = \$40 (total revenue - VTS)

Brewers 2008 Attendance = 3,068,458  
 Brewers Total Revenue Estimate = \$184.1 million  
 Brewers Local Revenue Estimate = \$122.7 million

*Did the Brewers get their money's worth from CC Sabathia in 2008? YES and then some*

2008 Extra local revenue for Brewers from Sabathia = \$5.17 million (\$40 \* 129,220)  
 2008 Salary split paid by Brewers: \$5.0 million (45.1% \* \$11 million)  
 2008 MRP Salary for Sabathia in Milwaukee = \$11.5 million (\$5.17/.451)

*Should the Brewers compete with the Yankees for CC? NO the game is too rich.*

Estimated total revenue multiple in New York is \$120 per fan or \$80 per fan net HTS.  
 The 2009 MRP salary for Sabathia in New York City is 2X Milwaukee = \$23 million.

*Would revenue sharing make the Brewers more competitive with the Bombers? NO revenue sharing would not change the relative revenue advantage of NYC.*

If the VTS was doubled to 68% then Sabathia's salary would be proportionately cut in half in both Milwaukee and NYC but his relative MRP of 2:1 would not change.

In this case CC would still move to the Yankees except his salary would also be cut in half to \$11.5 million in NYC compared to \$5.75 million for the Brewers. All the Yankees needed to offer was a salary just above the next highest offer.

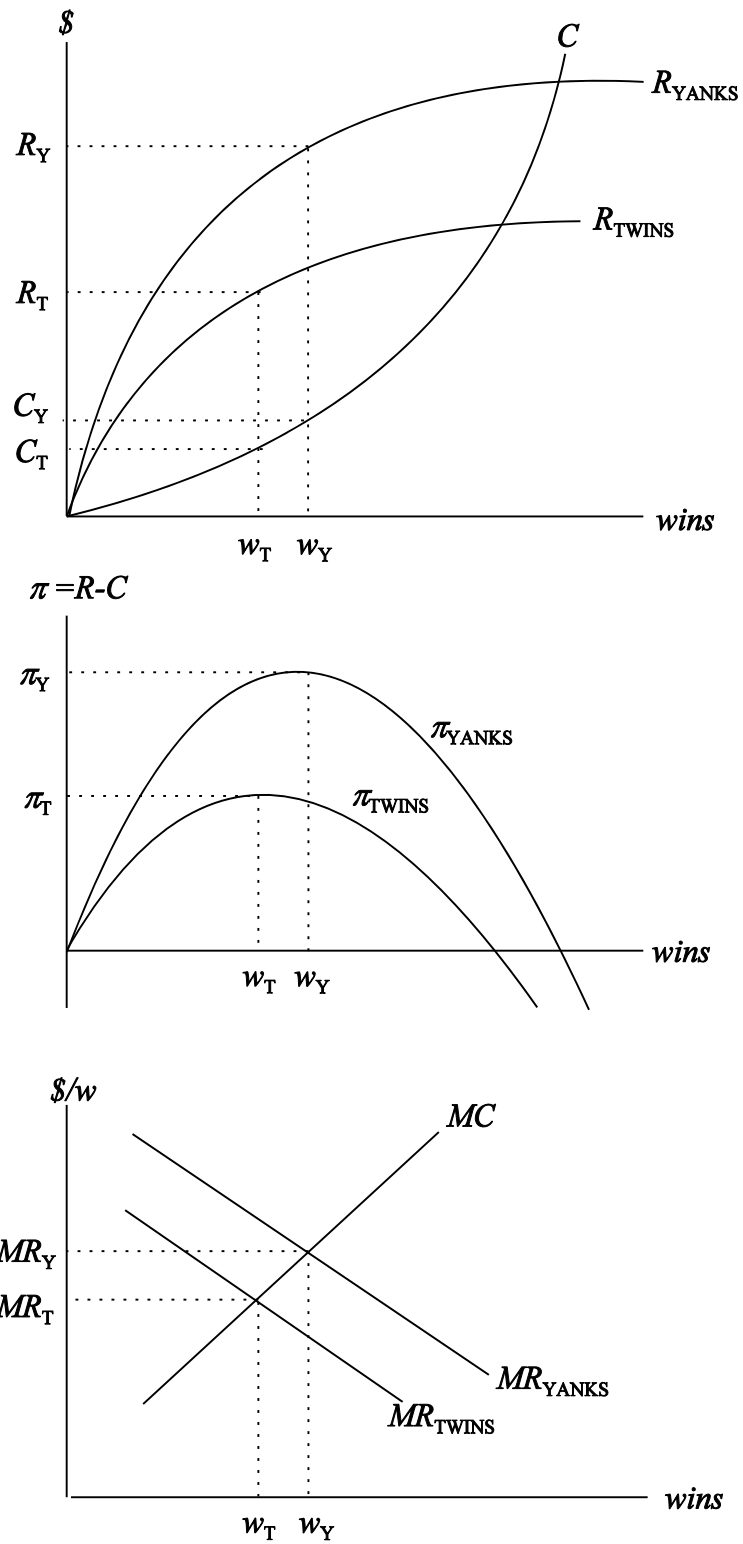
*What would happen without revenue sharing? CC would then be paid his full MRP but he would still go to the Bombers.*

If revenue sharing was eliminated then CC's MRP in NYC would jump to \$31.2 million compared to \$15.6 million in Milwaukee, but the MRP ratio would remain 2:1 in favor of NYC.

*In the land of the bottom line, CC Sabathia is a "gone pecan" regardless of revenue sharing and the only effect of more revenue sharing is to lower CC's relative salary for all clubs by the VTS (visiting-team share).*

*Milwaukee Journal-Sentinel interview with John Vrooman, Vanderbilt University*

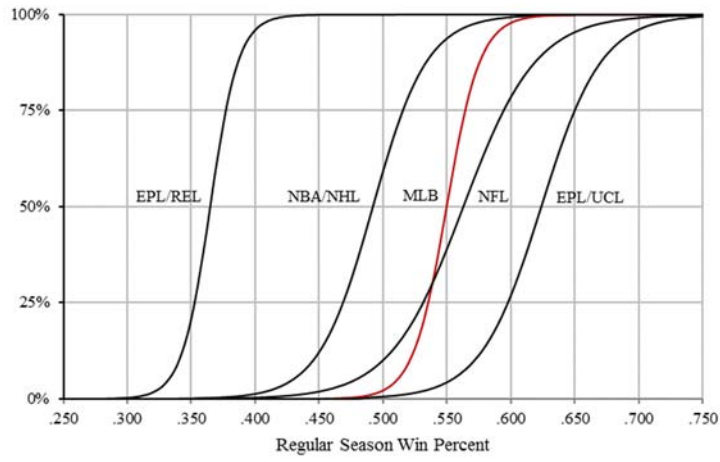




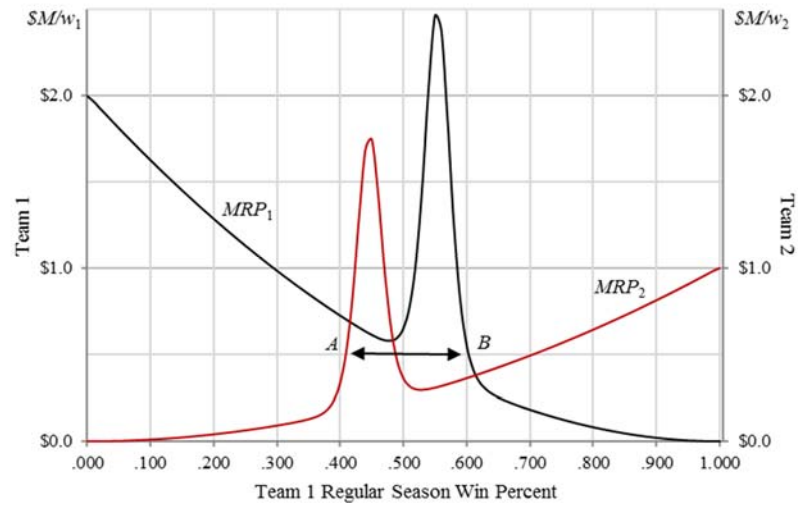
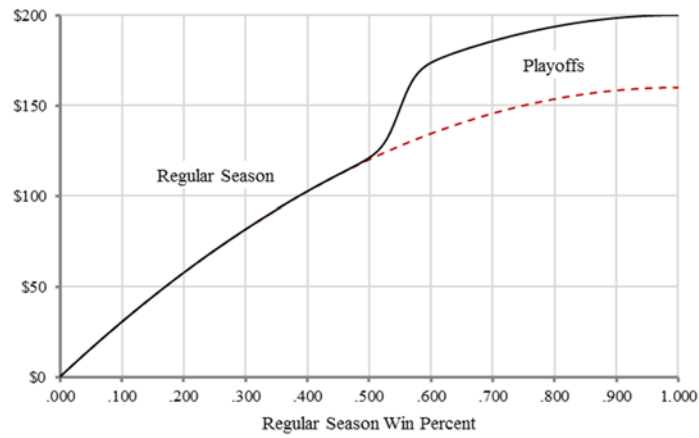
**Figure 1.** Unconstrained Yankee Dominance

# CHAMPION EFFECT

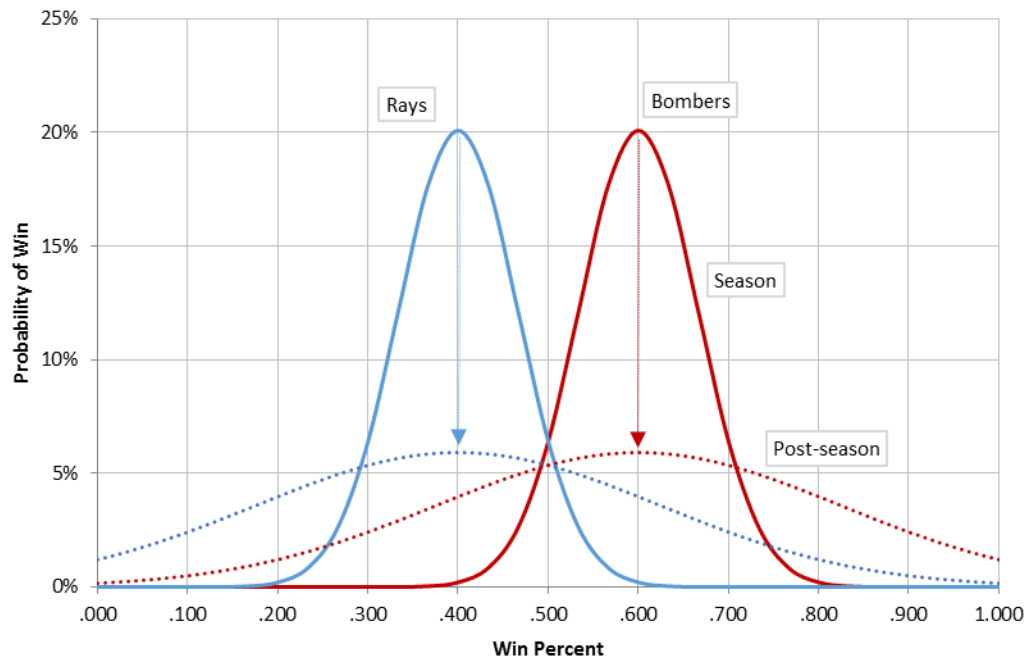
Playoff Chances



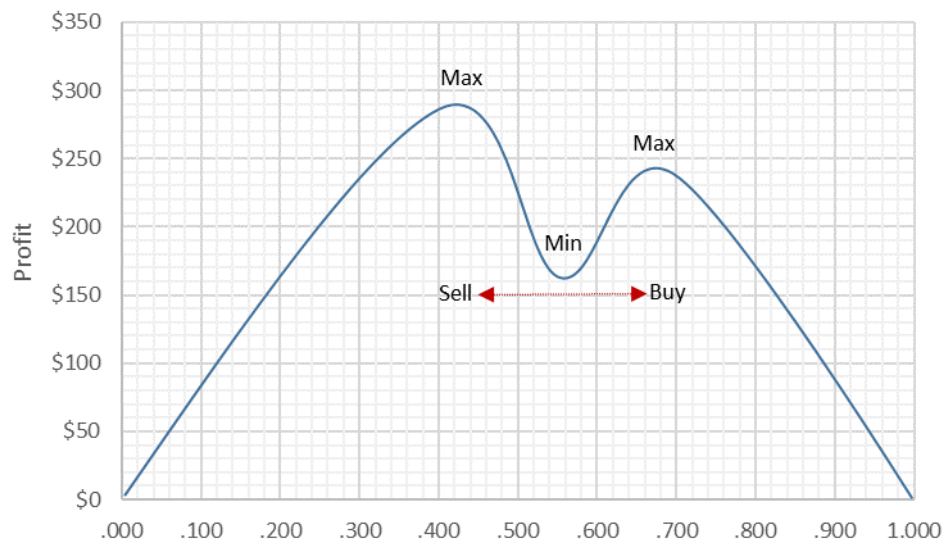
Revenue  
\$M



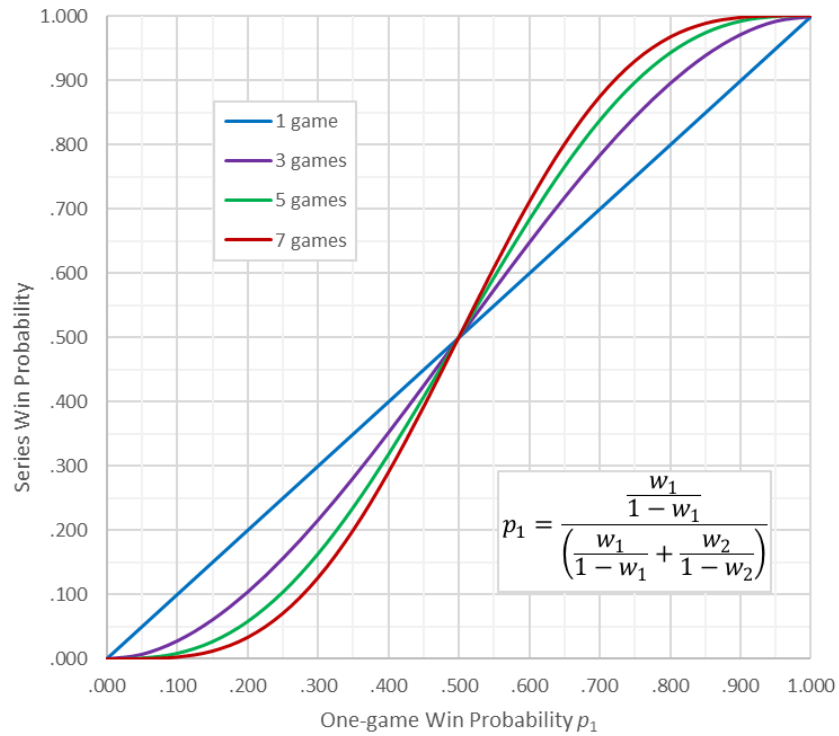
Probability of Upset in MLB Post-Season



MLB Trade Deadline



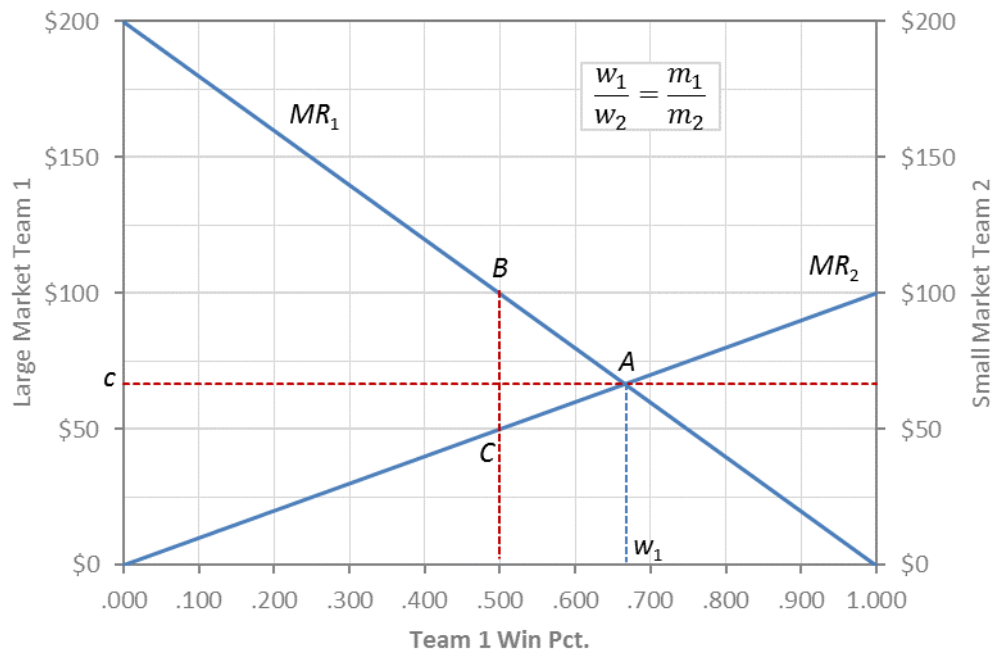
## Win Probability and Series Length



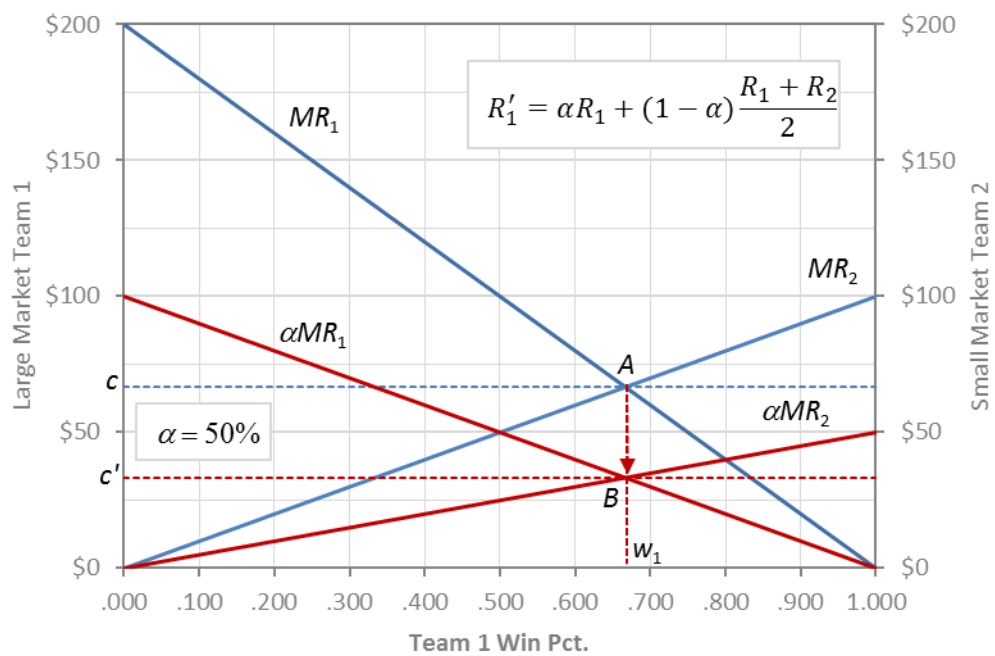
Source: John Vrooman/Vanderbilt

Win Probabilty and Series Length				
Prob	1 game	3 games	5 games	7 games
.000	.000	.000	.000	.000
.050	.050	.007	.001	.000
.100	.100	.028	.009	.003
.150	.150	.061	.027	.012
.200	.200	.104	.058	.033
.250	.250	.156	.104	.071
.300	.300	.216	.163	.126
.350	.350	.282	.235	.200
.400	.400	.352	.317	.290
.450	.450	.425	.407	.392
.500	.500	.500	.500	.500
.550	.550	.575	.593	.608
.600	.600	.648	.683	.710
.650	.650	.718	.765	.800
.700	.700	.784	.837	.874
.750	.750	.844	.896	.929
.800	.800	.896	.942	.967
.850	.850	.939	.973	.988
.900	.900	.972	.991	.997
.950	.950	.993	.999	1.000
1.000	1.000	1.000	1.000	1.000

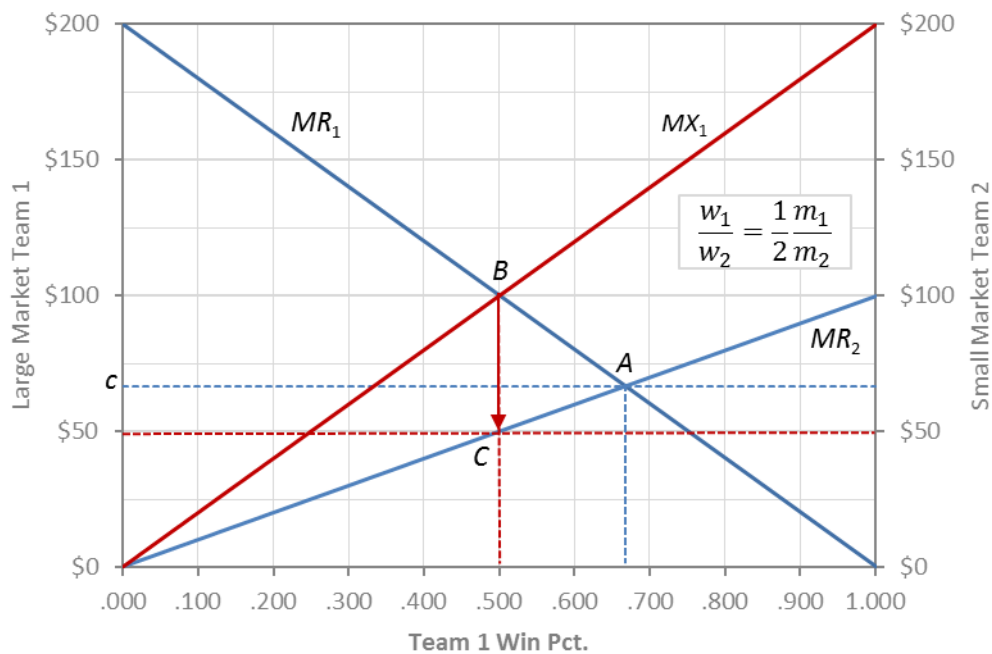
### Basic QFV Theory



### Revenue Sharing Paradox



### Dominant Monopsony Solution



### Salary Cap

