

What is the Perfect Cole Hamels trade?

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Overview

Projecting Hamels

- kNN by batted ball type and DIPs
- Risk in projection, Range of Outcomes

Determining the Market

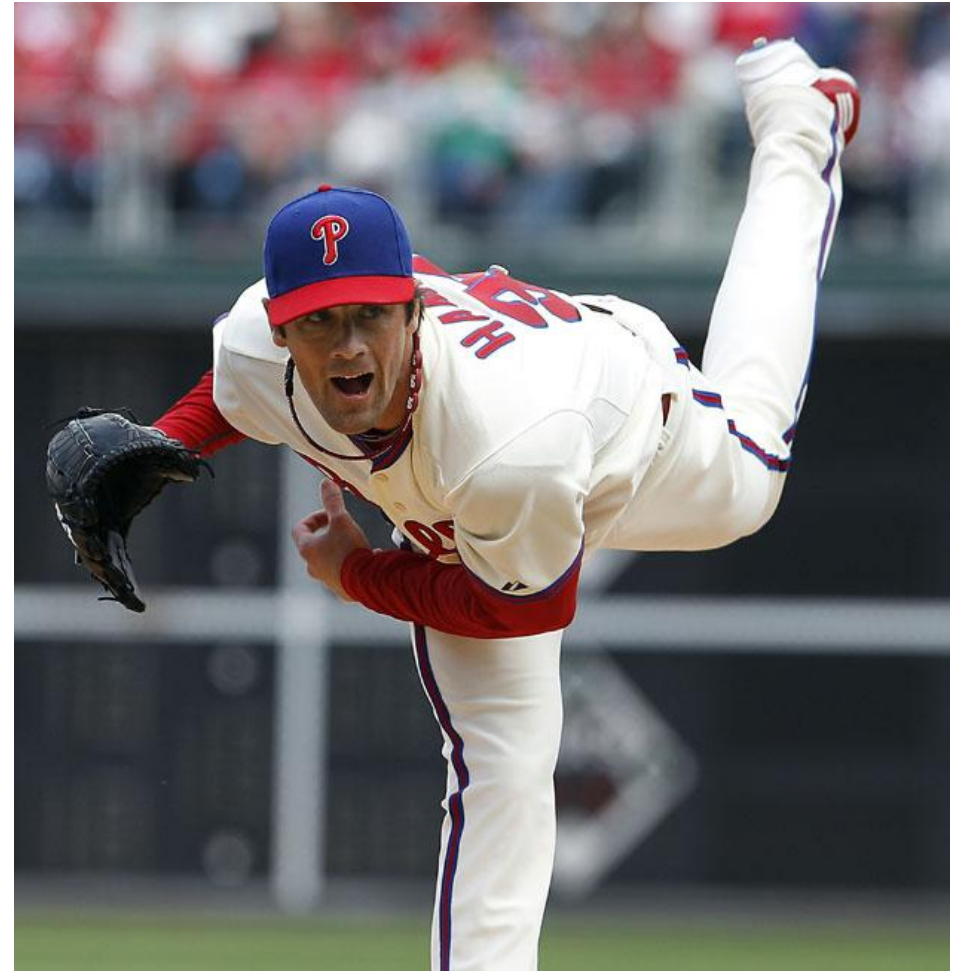
- Playoff Probabilities, Win Curve
- Payroll Flexibility
- Park Factors

Creating a Framework for Trade Evaluation

- Prospect Projections
- Paying a Premium for more reliable talent

Developing a Trade Package

- Teams
- Package



Projecting Hamels – Methodology

K-Nearest Neighbor Model

- 10 Closest Neighbors
- Rate Stats - K%, BB%, HR%, LD%, GB%, FB%, HR/FB, FIP
- Counting Stats - IP, WAR

Sample

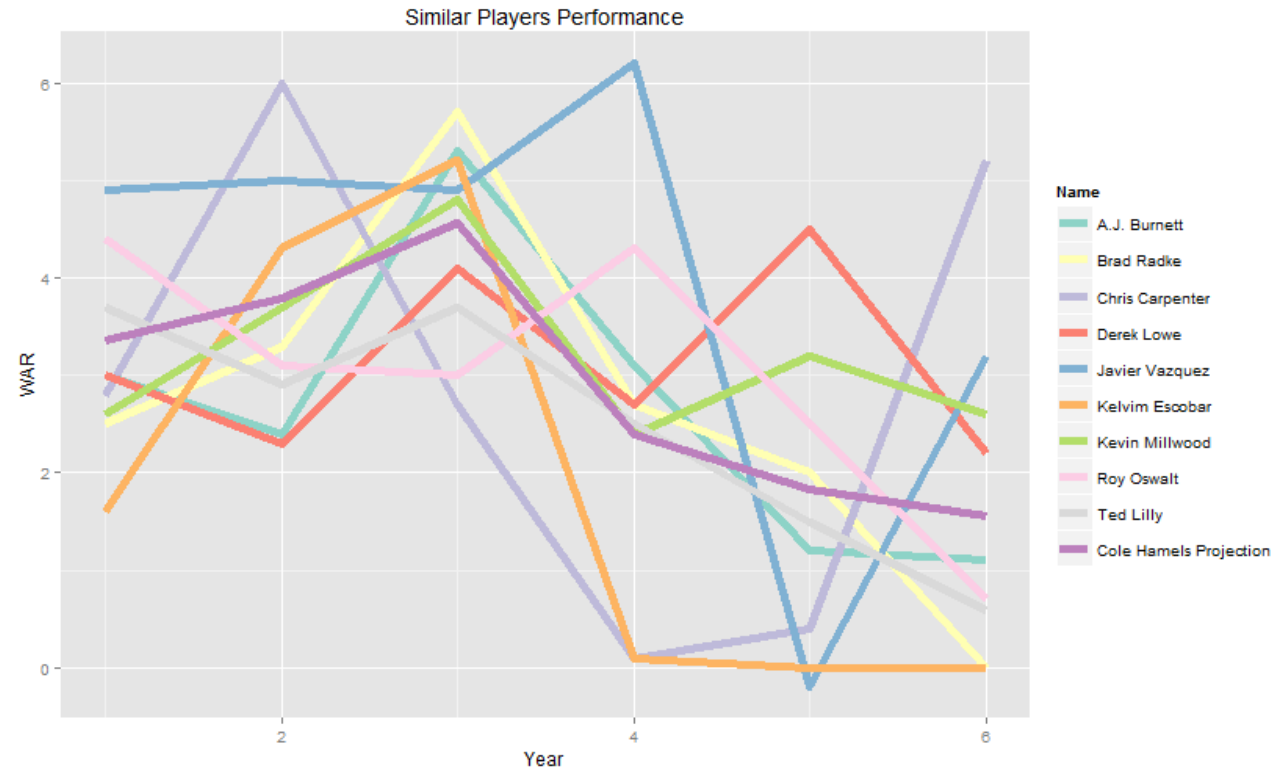
- 2002-2009 Player seasons
- 29-33 year olds

Risk

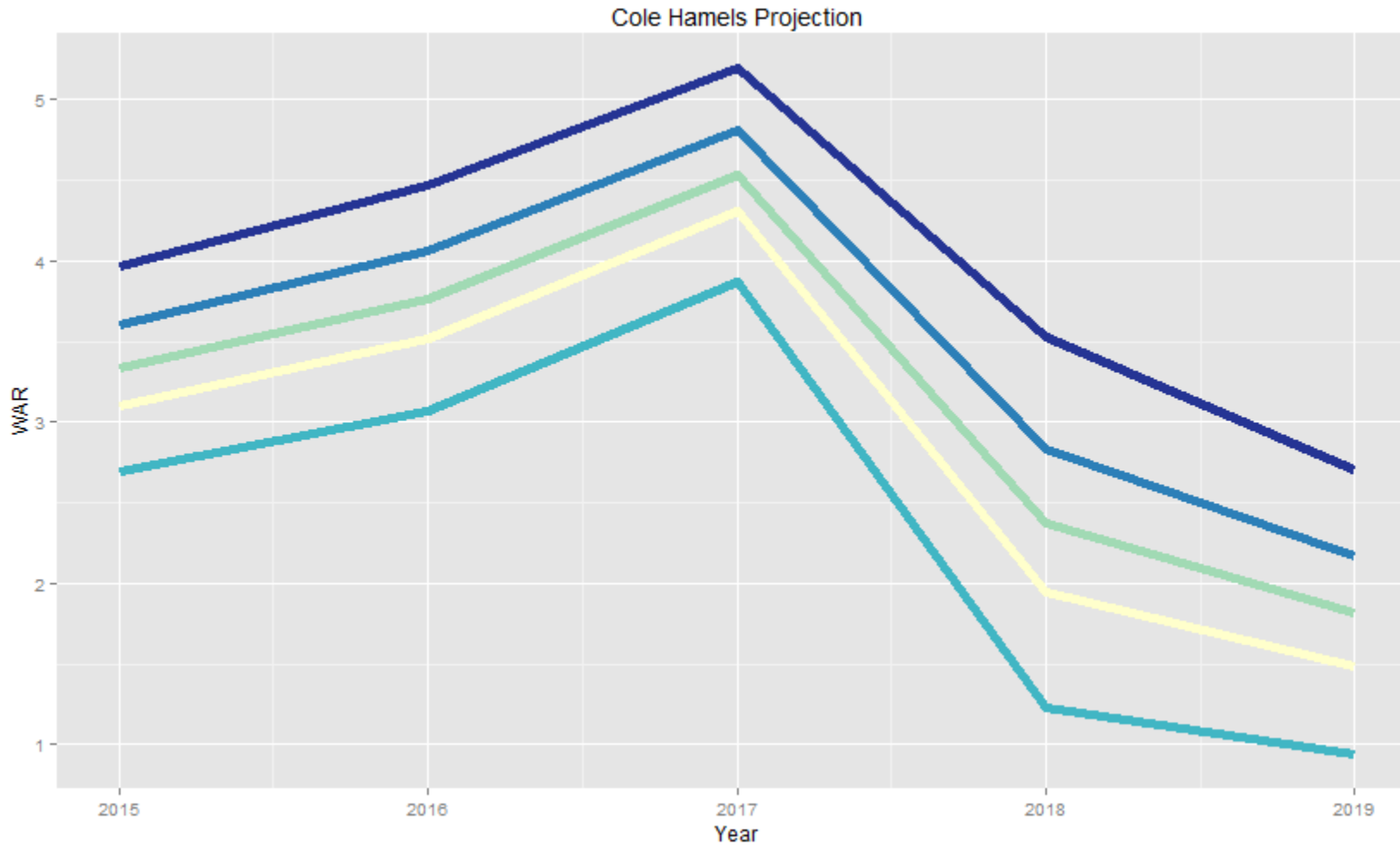
- Projected 5th, 25th, 75th, 95th percentile results as well

Projecting Hamels – Nearest Neighbors

Similar Pitchers	Age
Kevin Millwood	29
Javier Vasquez*	29
Ted Lilly	31
Roy Oswalt	29
Chris Carpenter	29
Derek Lowe	31
Brad Radke	29
A.J. Burnett	29
Kelvim Escobar	29



Projecting Hamels – Results



Projecting Hamels – Results

	2015	2016	2017	2018	2019	Total For Contract
5 th Percentile	2.87	3.06	3.87	1.23	0.94	11.03
25 th Percentile	3.10	3.51	4.30	1.94	1.49	12.85
50th Percentile	3.33	3.77	4.53	2.38	1.82	14.01
75 th Percentile	3.60	4.06	4.81	2.83	2.17	15.30
95 th Percentile	3.97	4.47	5.19	3.52	2.70	17.15

Determining the Market – Methodology

Estimating Teams' Playoff Probability Chances

- Simulation, Playoff Probability Curve
- PECOTA Variation Over Time

Revenue Impacts

- Win-Revenue Curve
- Playoffs Revenue

Payroll Flexibility

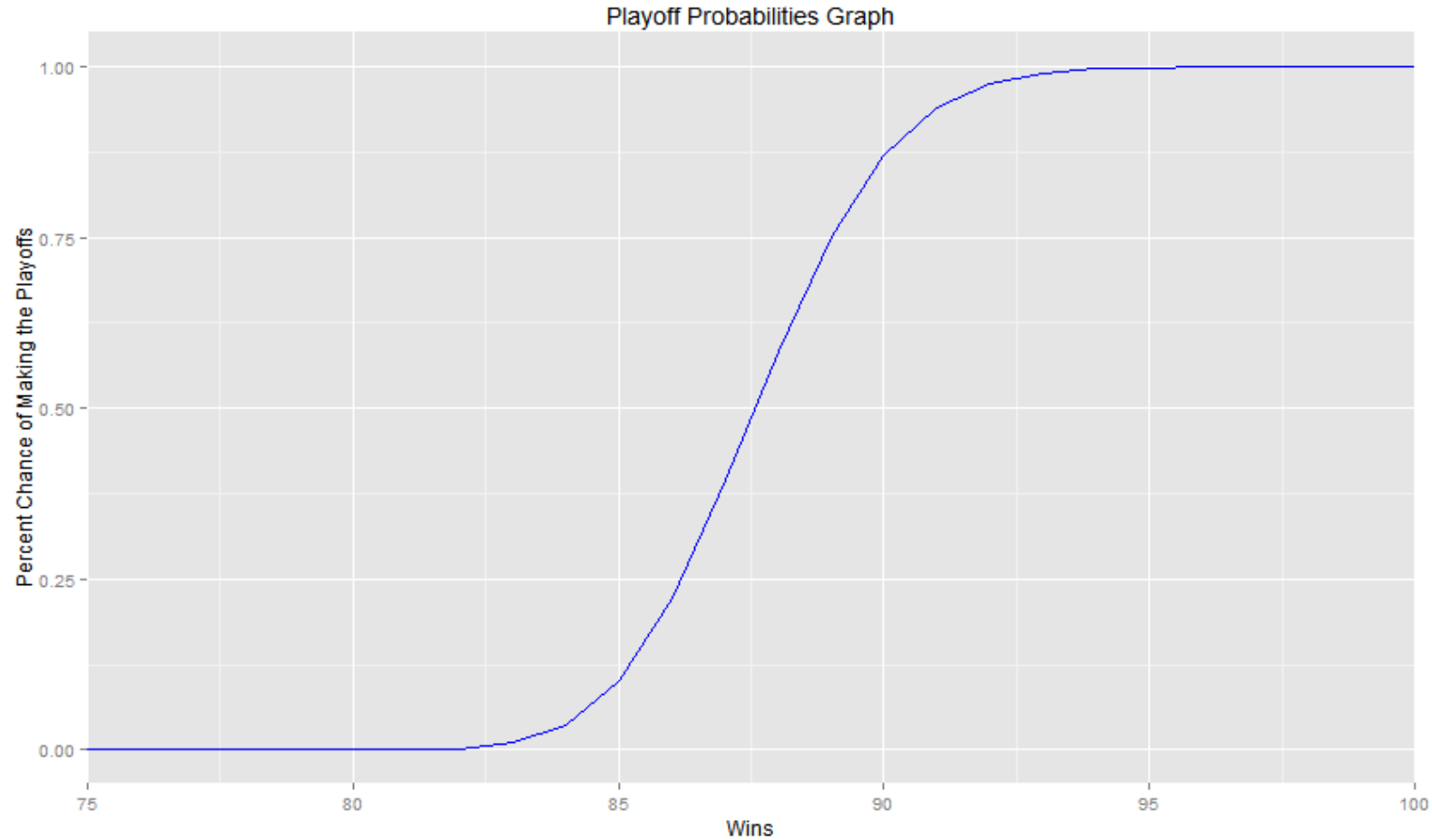
- Inflation
- Past Spending

Park Effects

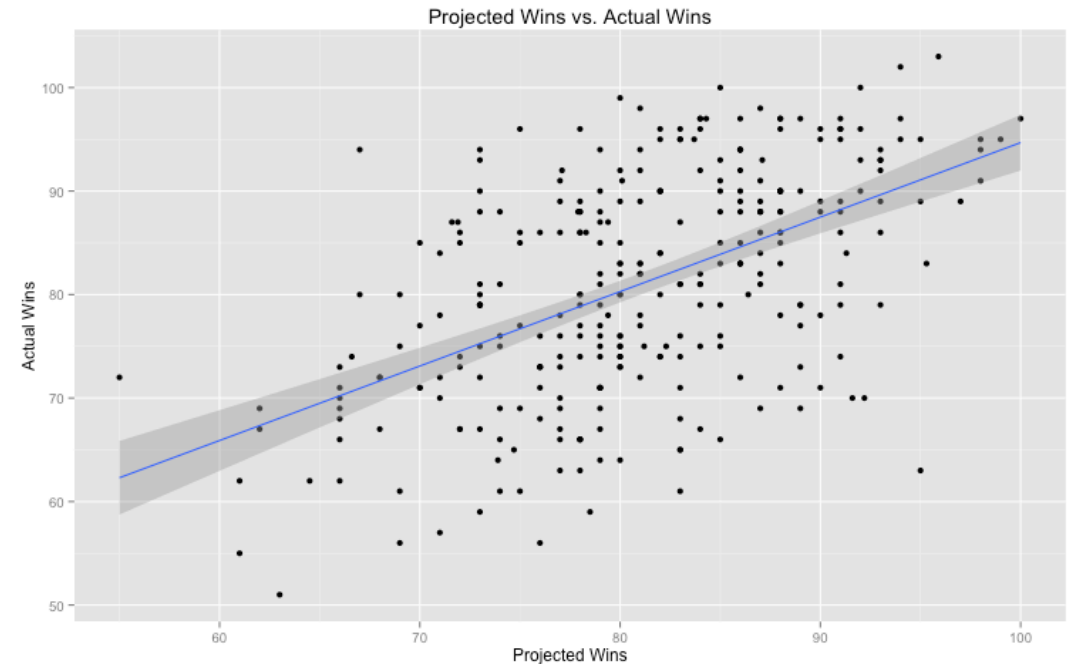
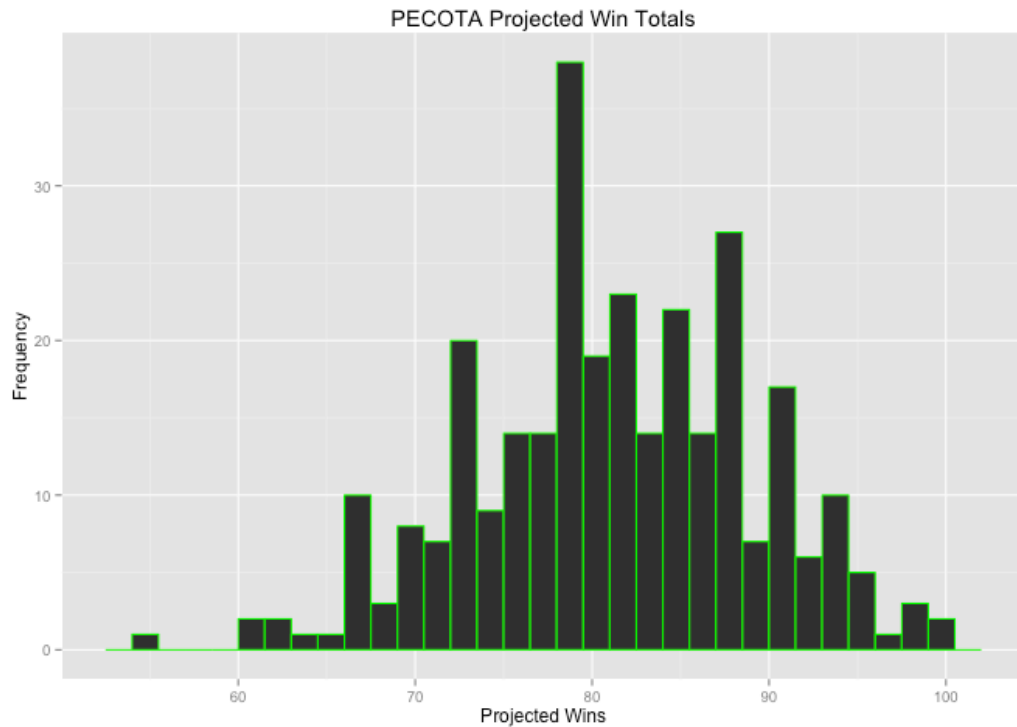
- K-Means Clustering



Determining the Market – Playoff Probability



Determining The Market – Playoff Probability (cont.)



- $R^2: 0.282$
- PECOTA from 2005-2014
- Standard deviation of actual wins change at different win levels
- $P(\text{Team makes playoffs}) = \sum_{i=1}^{162} P(\text{Team gets } i \text{ wins}) * P(i \text{ wins makes playoffs})$

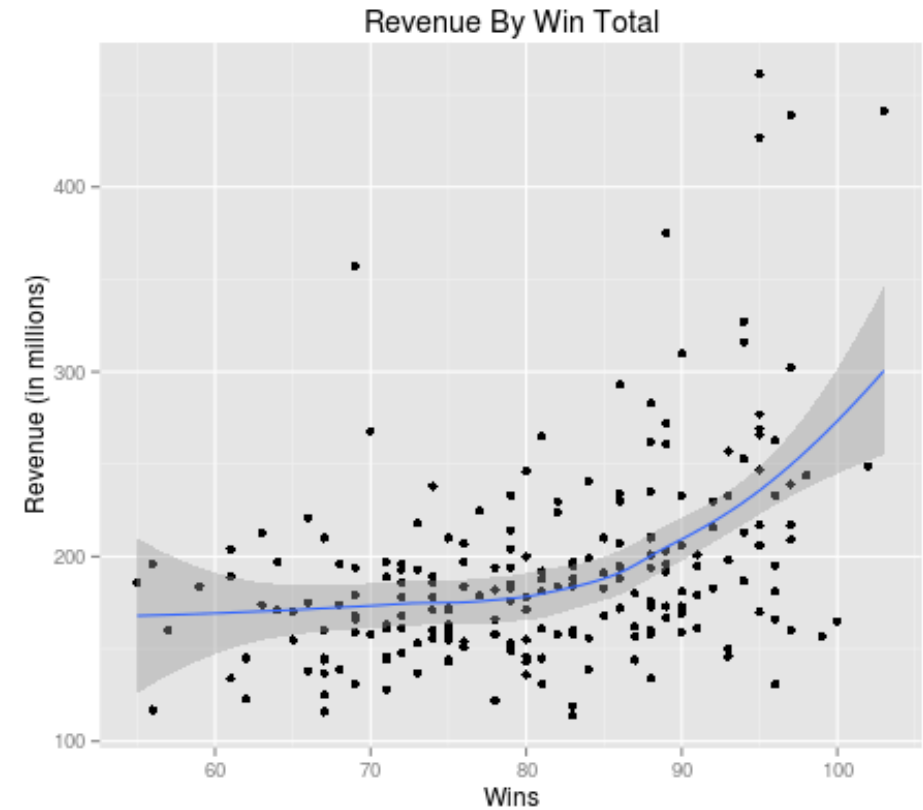
Determining the Market – Revenue and Wins

Revenue Data

- Forbes 2005-2014

Compared previous year Wins and Playoff Appearance to Revenue

- Ran Regression controlling for Year, Teams, Making Playoffs, and Wins
- $R^2 = 0.927$
- Projected revenue of an extra win in 2015: \$35,310
- Projected revenue for making playoffs in 2015: \$52,014,000



Determining the Market – Payroll Flexibility

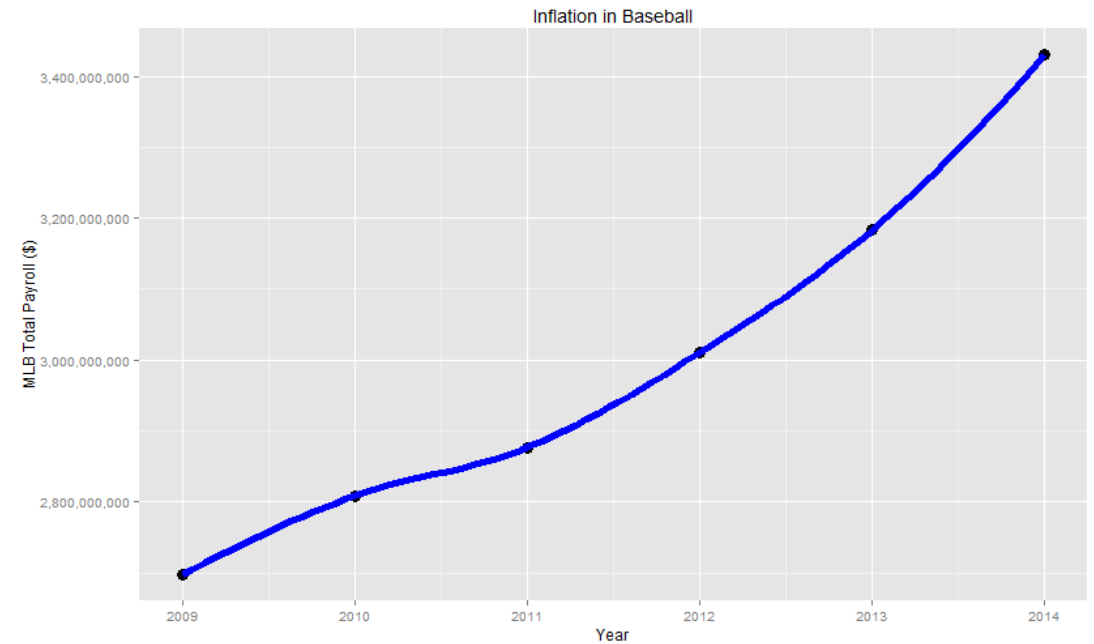
Past 5 years of Payrolls (via Cot's Contracts)

Inflation approximately 5.18% each year

Expected 2015 Payroll

- Took a weighted average of past 5 years
- In 2015 dollars

Free Payroll = Expected 2015 Payroll –
Current Payroll



Determining the Market – Park Factors

WAR Park Factors

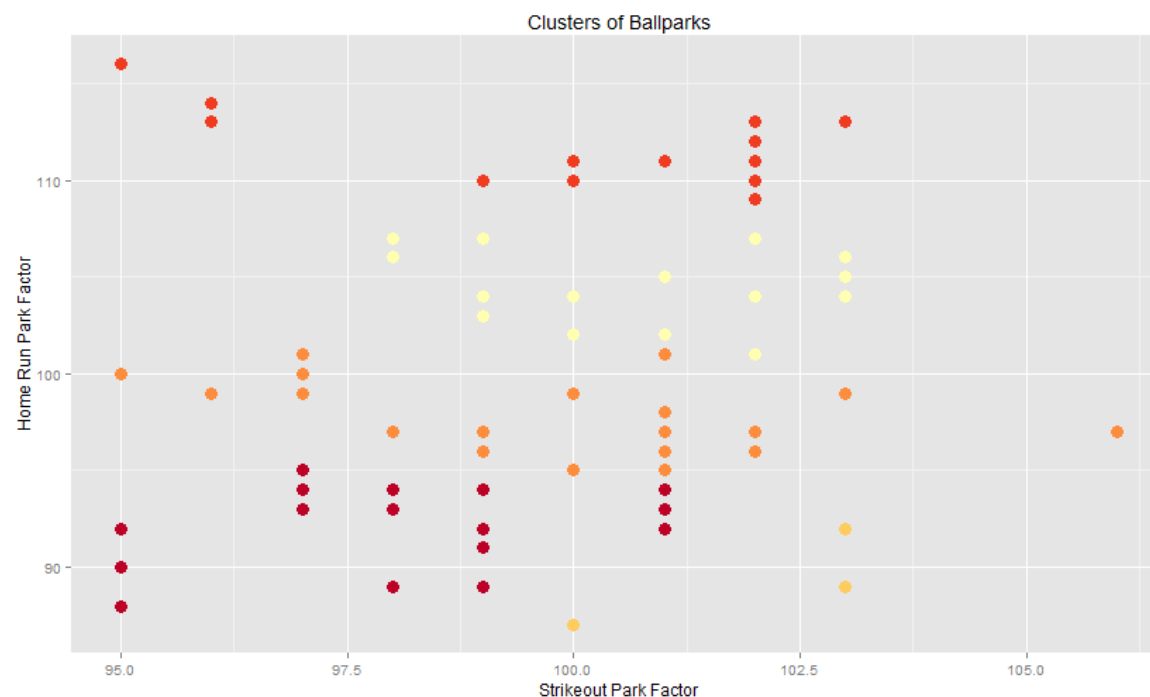
- League-wide averages

Calculating Hamels Specific Park Factors

- NL East Teams
- Braves: Park Factor = 108, Sample Size = 35
- Nationals: Park Factor = 85, Sample Size = 23

Clustered Ballparks

- K-means into 5 groups
- FIP Park Factors: SO, BB, HR



Determining the Market – Teams



Team	Proj Wins	Proj Wins W/Hamels	Playoff Chances	Playoff Chances W/Hamels	Difference	Free Payroll
Red Sox	87	91.2	47.52%	65.22%	17.70%	\$2,836,233
Tigers	83	87.5	32.21%	49.47%	17.26%	-\$5,195,532
Rangers	82	86	27.06%	43.57%	16.51%	\$426,672
Yankees	80	83.7	20.36%	34.76%	14.40%	\$24,492,930
Angels	90	93.6	60.26%	74.32%	14.05%	\$22,183,155

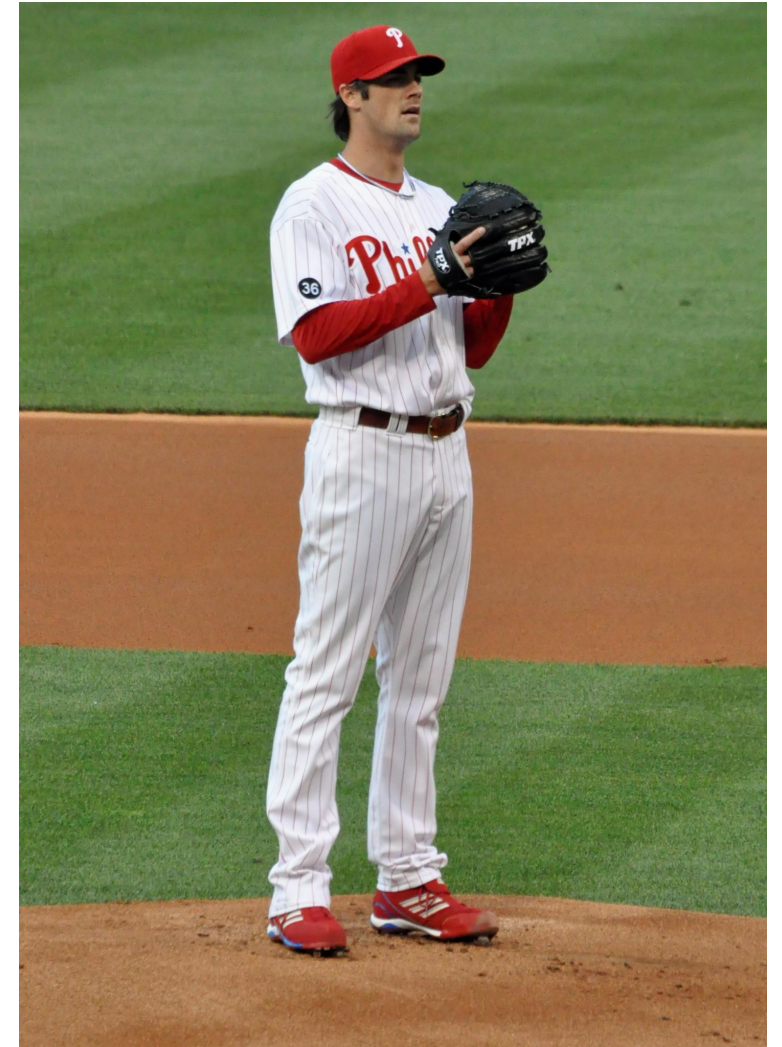
Evaluating Trades – Methodology

Prospect Projections

- Sickels Prospects Grades
- Probability of Making Majors
- Expected Performance in first 6 seasons

Past Trades

- Risk in Production
- Premium for Short-Term Value



Evaluating Trades – Prospect Projections

John Sickels Prospect Rankings

- Top 20 for every organization
- Consistent and comparable across organizations
- 2006-2009 data
- Translated to scouting scale

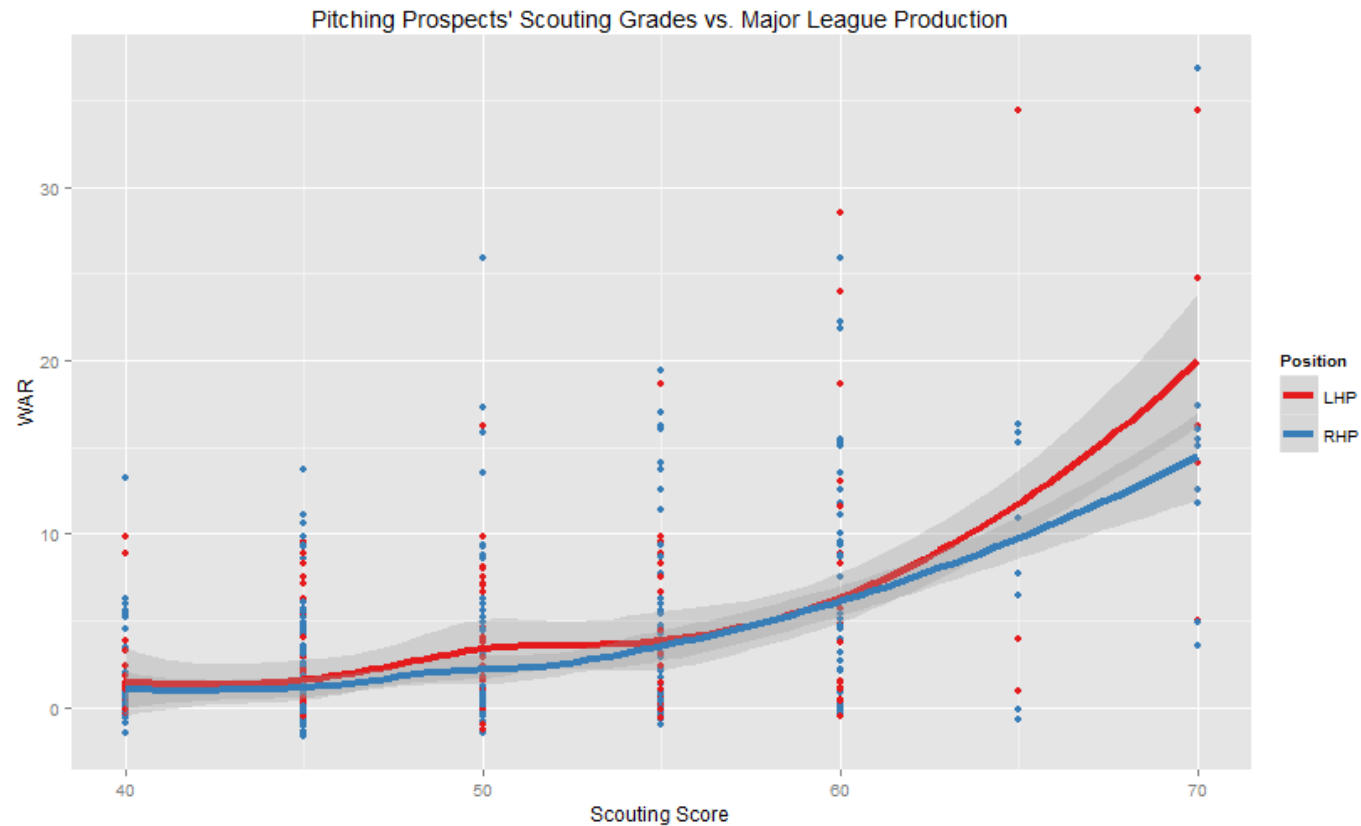
Projecting Major League Value

- Probability of making the majors (based on scouting score, position)
- Expected Major League WAR given that they make the MLB (based on scouting score, position)

Rank	Frequency	Percentage
A = 70	29	1.20%
A- = 65	65	2.68%
B+ = 60	201	8.30%
B = 55	333	13.75%
B- = 50	373	15.40%
C+ = 45	1015	41.91%
C = 40	406	16.76%

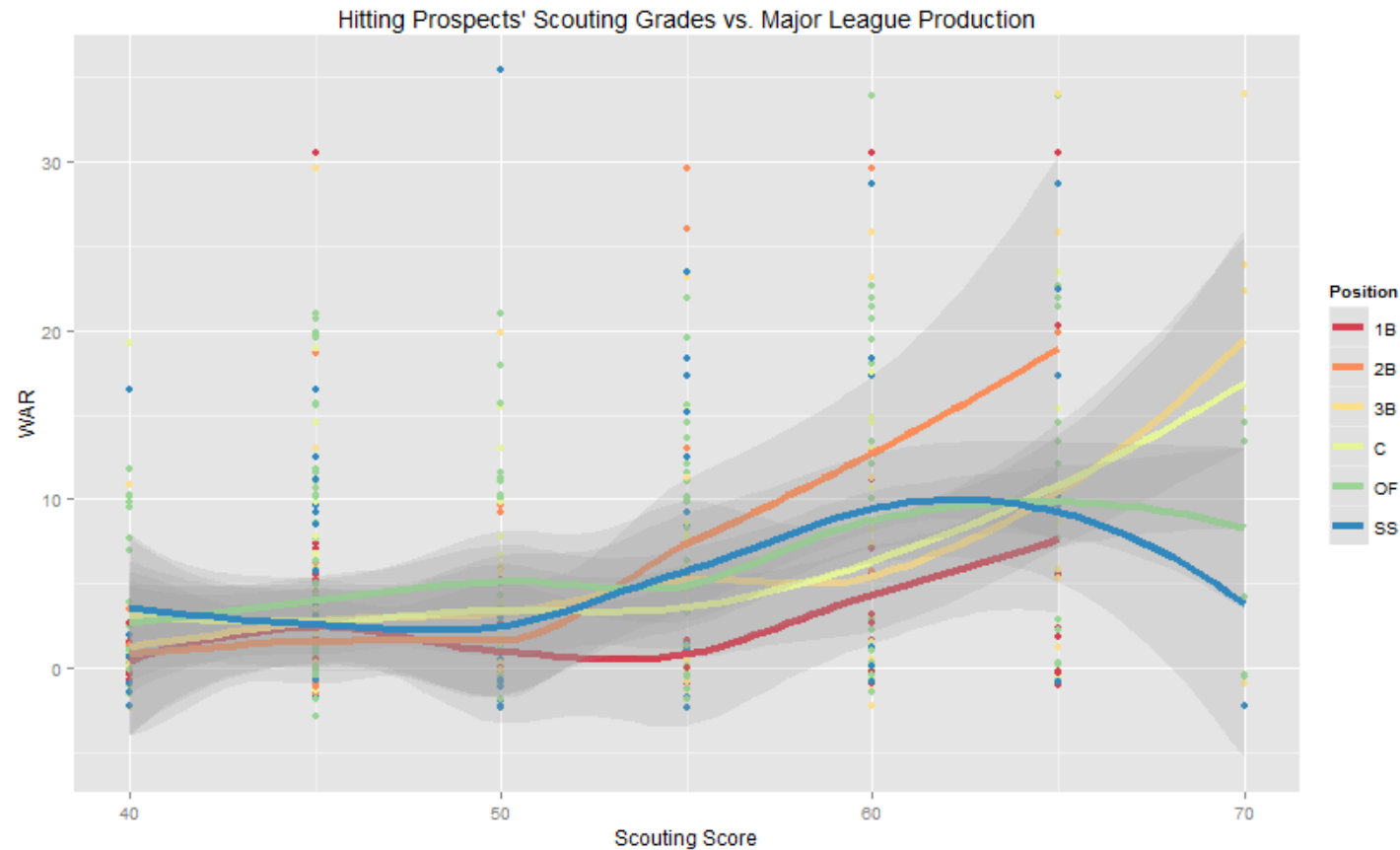
Evaluating Trades – Pitcher Prospects

Projected Pitcher Prospect WAR = $P(\text{Majors}) * \text{WAR}(\text{Majors}) = \phi (-2.829 + 0.066 * (\text{Scouting Score}) + \text{Positional Fixed Effect}) * (-10.502 + 0.297 * (\text{Scouting Score}) + \text{Positional Fixed Effect})$



Evaluating Trades – Hitter Prospects

Projected Hitter Prospect WAR = $P(\text{Majors}) * \text{WAR}(\text{Majors}) = \phi (-2.300 + 0.054 * (\text{Scouting Score}) + \text{Positional Fixed Effect}) * (-13.823 + 0.348 * (\text{Scouting Score}) + \text{Positional Fixed Effect})$



Evaluating Trades – Past Trades

Pitcher	Date	Age	Years of Controls	WAR through end of Contract (or until 2015)	Expected Prospect WAR	Actual Prospect WAR
Dan Haren	12/14/07	27	4	13.2	23.66	34.6
R.A. Dickey	12/17/12	38	4	4.5	4.34	1.4
Jake Peavy	7/31/09	28	3.5	9	7.28	2.7
Matt Garza	1/8/11	27	3	5.5	9.45	13.9
Mark Mulder	12/18/04	27	3	0.1	20.16	28.2
Tim Hudson	12/16/04	29	3	9.3	25.16	0.8
Dan Haren	7/25/10	30	2.5	6.6	7.23	7.8
TOTAL				63.2	97.28	89.4

Criteria: 1) Similar track record as Hamels
 2) 27+ years old
 3) 2.5+ years of control remaining

Ratio of Projected Prospect WAR to
 Projected Pitcher WAR = $97.28/63.2 = 1.53$

Evaluating Trades – Teams' Expected WAR from current Prospects

Team	Expected WAR of top 5 prospects	Expected WAR of top 20 prospects
Boston Red Sox	34.97	74.29
Texas Rangers	32.36	72.90
New York Yankees	31.35	67.95
Los Angeles Angels	22.58	39.20
Detroit Tigers	17.37	37.78

- Projected WAR for Hamels over 4 years is 14.01
- Expected WAR Return = $14.01 \times 1.53 = 21.44$

Trade 1 – Texas Rangers



Phillies give: Cole Hamels, Carlos Ruiz, \$20 million

Rangers give: Nomar Mazara, Jorge Alfaro, Nick Williams, Ryan Rua, Michael De Leon, Luke Jackson

Rangers were projected 82-80 before the trade, 87.9-74.1 after

Rangers Playoff Probability increases by 22.95% (27.05% to 50%)

- Expected Revenue Gain: \$12,140,000

Phillies greatly improve outfield depth, get catcher of the future

Name	Position	Age	Expected WAR
Cole Hamels	LHP	31	14.01
Carlos Ruiz	C	36	4.5
TOTAL			18.51

Name	Position	Age	Expected WAR
Nomar Mazara	OF	19	8.48
Jorge Alfaro	C	21	6.05
Nick Williams	OF	21	4.56
Ryan Rua	OF	24	4.56
Michael De Leon	SS	17	2.41
Luke Jackson	RHP	23	1.73
TOTAL			27.78

Trade 2 – Boston Red Sox



Phillies give: Cole Hamels

Red Sox give: Rafael Devers, Manuel Margot, Deven Marrero, Brian Johnson, Edwin Escobar

Red Sox were projected 87-75 before the trade, 91.2-70.8 after

Red Sox Playoff Probability increases by 17.77% (47.52% to 65.22%)

- Expected Revenue Gain: \$9,390,000

Phillies get a nice balance of high upside young talent, and major-league ready talent

Name	Position	Age	Expected WAR
Cole Hamels	LHP	31	14.01
TOTAL			14.01

Name	Position	Age	Expected WAR
Rafael Devers	3B	18	7.63
Manuel Margot	OF	20	6.47
Deven Marrero	SS	24	3.97
Brian Johnson	LHP	24	2.34
Edwin Escobar	LHP	22	1.01
TOTAL			21.43

Conclusion

Cole Hamels is a Reliable, Elite Pitcher

Teams should be willing to part with approximately 150% of expected WAR in prospects to receive reliable, short-term wins

Rangers and Red Sox stand to benefit a lot for acquiring Hamels

- Rangers: 22.95% Playoff Probability increase to give up projected 27.78 future WAR
- Red Sox: 17.77% Playoff Probability increase to give up projected 21.43 future WAR

