

# **THE VALUE OF COLLEGE: DRAFTED HIGH SCHOOL BASEBALL PLAYERS**

Jason Winfree

Chris Molitor

# Research Question

- In many sports, drafted athletes have the decision of entering college or playing their sport professionally
- We analyze the decision of drafted high school baseball players, based upon their expected lifetime earnings

# Research Question

- The financial benefits of entering professional baseball early include
  - Signing bonuses for high draft picks
  - Higher possibility of earning an MLB salary
- The financial benefits of going to college include
  - Higher earnings for a non-baseball career

# Research Questions

- Do players play minor league baseball if it decreases their lifetime earnings?
- Do expected earnings change when the labor supply decreases?
  - Rule change with the players union

# Baseball Draft

- The MLB draft began in 1965
- June (regular), August and January
- There are now 50 rounds
  - Best players are picked in the early rounds

# Previous Studies

- Spurr (2000) showed using a similar data set that teams are not significantly different when drafting players
- However, no studies have estimated lifetime earnings of drafted players that may or may not enter college

# Previous Studies

- A classic problem in the returns to education literature is the sample selection problem
- However, we can control for baseball ability by using the draft round

# Model

- We estimate the lifetime earnings of the players

$$\begin{aligned} \text{EXPECTED EARNINGS} = & BNS e^{-rt_c} + \int_{t_c}^{t_1} MLSL e^{-rt} dt \\ & + \int_{t_1}^{t_2} MLBSL e^{-rt} dt + \int_{t_2}^{t_3} NBSL e^{\beta_c t_c + \beta_{w1}(t-t_2) + \beta_{w2}(t-t_2)^2 - rt} dt \end{aligned}$$

# Assumed Values

- Certain values were assumed

Discount rate = 5%

MLSL = \$16,650

MLBSL = \$2.3 million (2003 MLB average)

Starting non-baseball salary with no education  
= \$17,411 (2003 Census data)

# Assumed Values (con't)

Length of college education,  $t_2 = 0$  or 3.352 years

Length of working career,  $t_4 = 40$  years

Returns to one year of schooling,  $\beta_1 = 10\%$

Returns of yearly experience (linear),  $\beta_2 = 6\%$

Returns of yearly experience (quadratic),  $\beta_3 = -.25\%$

# Statistical Estimation

- Three variables were estimated using a two-stage Heckman regression
  - Expected signing bonus
  - Minor league career length
  - Major league career length

# Data

- 2003 signing bonus data was used for signing bonus estimates
- Draft data came from various sources
  - 1965-1980
  - 7800 observations, 992 played MLB
  - The variables include draft year, draft round, major league games played, and minor league years played
  - All observations were in the June “regular” draft

# Data

- Number of minor leagues years excludes the Mexican leagues
- Number of major league games was normalized by position
  - EX: for a pitcher games were multiplied by 3.18
- To find years, the number was divided by 150

# Signing bonus for players that did not go to college

- To estimate the signing bonus for players that played minor league baseball, we simply take the average signing bonus for players in that round in 2003

# Signing bonus variables

- We estimate the 2003 avg. bonus for the round the player was drafted in when they signed
- the round they were drafted in after high school (linear and quadratic)
- Their position, catcher, infield or outfield
- Linear time trend
- If college freshman could be drafted (1965 & 1966)
- If a player is from the south

# Signing bonus results

Two-stage Heckman Model		
Explanatory Variable	Probit Estimation	Second Stage Estimation
Constant	-0.6784**	526.896
Round	-0.0286**	-24.769
Round <sup>2</sup>	0.0003**	0.259
Catcher	-0.1719*	-81.341
Infielder	0.0927	-0.084
Outfielder	-0.1023	3.676
Year	0.0283**	-2.559
Rule	0.2706**	44.938
South	-0.1528**	7.389
Log-Likelihood	-2188.82	
R <sup>2</sup>		0.0399
Sample Size	4790	864

# Minor and Major League variables

- We then estimate the length of the minor league and major league career
- We use the same variables, plus...
- Which team drafted them (immediately pro only)

# Minor league results

Players that immediately entered minor league baseball	
Explanatory Variable	OLS Estimation
Constant	6.6873**
Round	-0.2223**
Round <sup>2</sup>	0.0031**
Catcher	-0.5047**
Infielder	-0.1617
Outfielder	-0.3517*
Year	0.0545**
Rule	0.5275**
South	-0.2932*
R <sup>2</sup>	.1765
Sample Size	3010

# Minor league results

Players that went to college		
Explanatory Variable	Probit Estimation	Second Stage Estimation
Constant	0.3062**	-0.7310
Round	-0.0371**	-0.2274
Round <sup>2</sup>	0.0004**	0.0024
Catcher	-0.0613	-1.1146**
Infielder	0.1114*	0.4204
Outfielder	-0.0758	-0.3321
Year	0.0174**	0.1691*
Rule	0.2695**	2.0708
South	-0.1933**	-0.8273
Log-Likelihood	-3161.43	
R <sup>2</sup>		.0303
Sample Size	4790	2094

# Major league results

Players that immediately entered minor league baseball		
Explanatory Variable	Probit Estimation	Second Stage Estimation
Constant	0.1698	-4.6610
Round	-0.1023**	-1.5077
Round <sup>2</sup>	0.0014**	0.0205
Catcher	-0.0835	0.3143
Infielder	0.0898	3.1074**
Outfielder	0.0055	1.5658*
Year	-0.0002	-0.0886
Rule	0.1813	2.1150
South	-0.0711	-1.2616
Log-Likelihood	-1257.20	
R <sup>2</sup>		.0770
Sample Size	3010	561

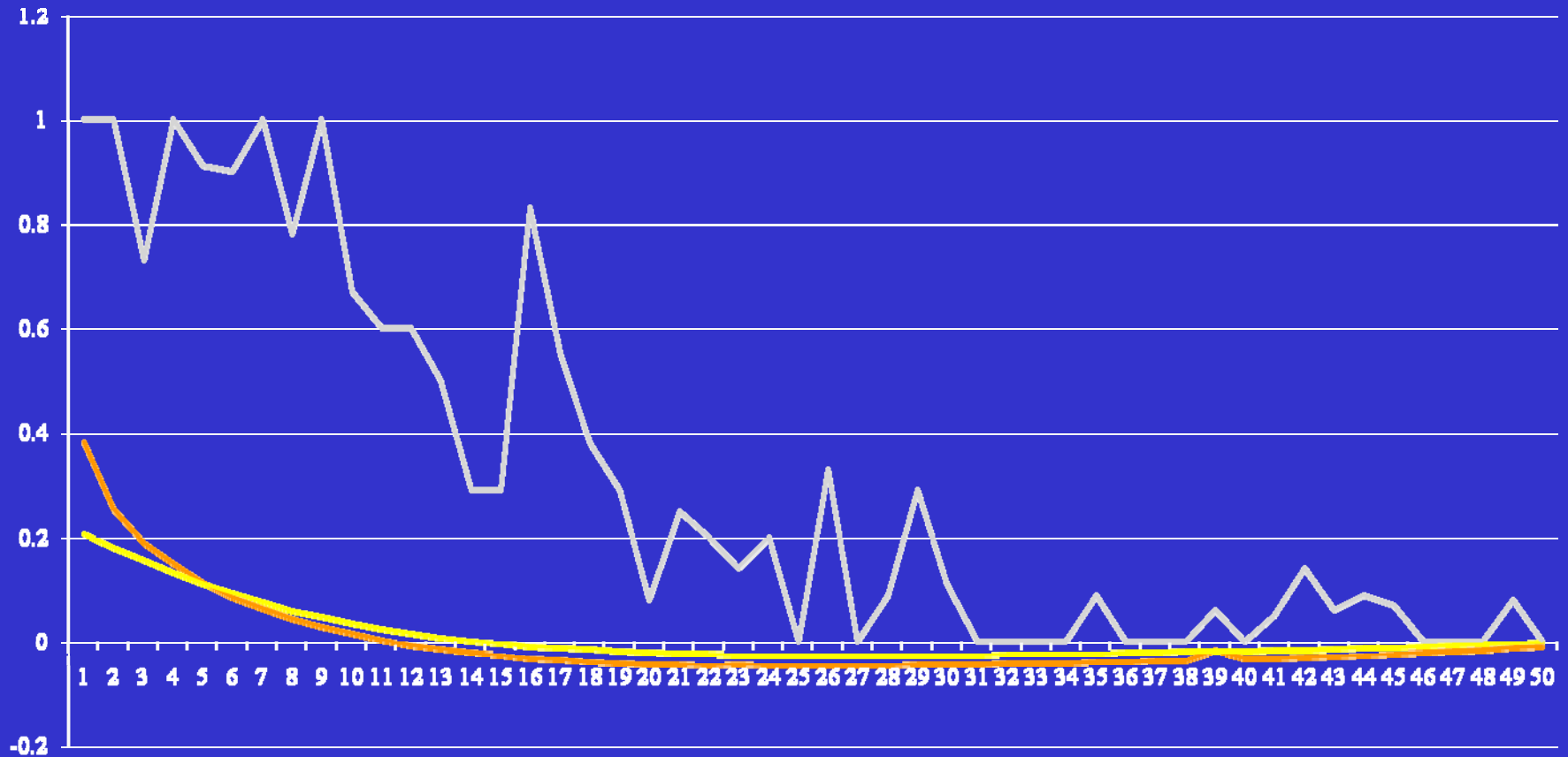
# Major league results

Players that went to college		
Explanatory Variable	Probit Estimation	Second Stage Estimation
Constant	-0.9556**	-26.6633
Round	-0.0425**	-0.8179
Round <sup>2</sup>	0.0005**	0.0089
Catcher	-0.4179**	-7.6685
Infielder	-0.0320	0.8961
Outfielder	-0.0027	0.6066
Year	0.0283**	0.5871
Rule	0.3350**	5.2722
South	-0.0808	-1.4489
Log-Likelihood	1375.78	
R <sup>2</sup>		.0317
Sample Size	4790	431

# Estimated Career Earnings

	Expected Earnings			Probability of playing MLB		
Round drafted	Minors after H.S.	college after H.S.	change in earnings	Minors after H.S.	college after H.S.	Change in probability
1	7365815	3534440	3831376	0.414	0.207	0.207
2	5898239	3350435	2547804	0.377	0.195	0.181
3	5067313	3178247	1889067	0.341	0.184	0.157
10	2422976	2252507	170469	0.159	0.124	0.034
11	2187153	2153492	33661	0.142	0.118	0.024
12	1993882	2061282	-67400	0.127	0.112	0.015
20	1107580	1521104	-413524	0.054	0.075	-0.021
30	754678	1174284	-419606	0.027	0.052	-0.025
40	708499	1029838	-321340	0.024	0.043	-0.019
50	917633	1012649	-95016	0.04	0.043	-0.002

# Who went to college?



- change in earnings (in \$10 millions)
- change in probability
- % that entered minors

# Results

- Financially, players should not go to college if they are drafted in the first 11 rounds
- Top high school draft picks will play more MLB games if entering pro baseball earlier
- decreasing the labor supply increases expected playing time and earnings for players that were drafted

# Future uses

- This can be used to find probability of playing MLB
- Player's future value or insurance value
- Recruiting tool