

THE VALUE OF COLLEGE: DRAFTED HIGH SCHOOL BASEBALL PLAYERS

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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 ²	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 ²		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 ²	0.0031**
Catcher	-0.5047**
Infielder	-0.1617
Outfielder	-0.3517*
Year	0.0545**
Rule	0.5275**
South	-0.2932*
R ²	.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 ²	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 ²		.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 ²	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 ²		.0770
Sample Size	3010	561

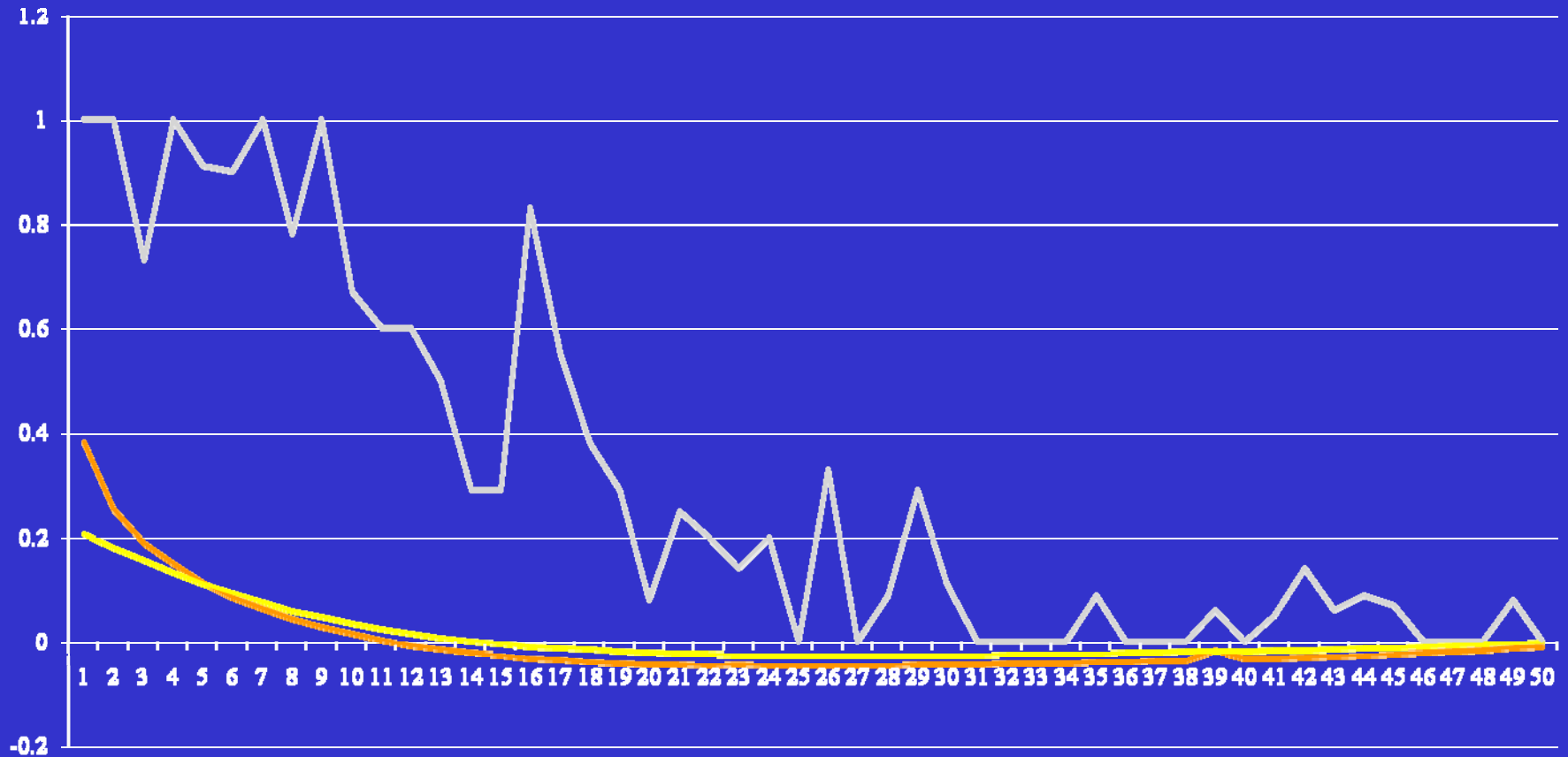
Major league results

Players that went to college		
Explanatory Variable	Probit Estimation	Second Stage Estimation
Constant	-0.9556**	-26.6633
Round	-0.0425**	-0.8179
Round ²	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 ²		.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