

# Diversifying Labor Income Risk: Evidence from Income Pooling

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January 2024

# Motivation

- ▶ Human capital represents nearly two-thirds of an individual's total wealth (*Madgavkar et al.*, 2022).
- ▶ Individuals face substantial fluctuations in lifetime labor income which has become increasingly volatile(*Guvenen et al.*, 2021, 2022)
- ▶ Limited options for individuals to hedge labor income risk
  - Unemployment insurance → tax on employment
  - Occupational sorting → sub-optimal allocation of human capital
- ▶ No empirical evidence surrounding selection and the effects of private labor market insurance (*Chiu & Karni*, 1998)
- ▶ **This paper:** Studies the introduction of private labor market insurance in professional baseball

# Goals and Inputs

## Goals

- ▶ Analyze selection into private labor market insurance contracts
- ▶ Examine effects of private labor market insurance on individual productivity
  - Heterogeneous effects by choice of contracting peers
- ▶ Instrument for insurance take-up relying on peer networks

## Inputs

- ▶ Contract data from a private insurance provider regarding individuals' choice and timing of contract
- ▶ Baseball performance measures regarding player output and efficiency

## Benefits

1. Measures of player quality
2. High-frequency measures of observable performance

## Main Results

1. Selection into private insurance contracts correlated with an individual's level of downside protection and sophistication
2. Individuals with insurance take-up are of lower ability
3. Performance declines for individuals after signing up
  - Declines offset when contracting with closer peers
4. Players' insurance pools are largely homogeneous

Introduction  
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**Baseball**  
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Pooling  
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Selection  
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Productivity  
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Identification  
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Pooling Partners?  
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Conclusion  
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References

# What is Baseball?

# Major League Baseball Structure

- ▶ Major League Baseball (MLB) is the top professional baseball league consisting of 30 affiliates across the United States and Canada [Map](#)
  - 2022, MLB revenue of nearly \$11 billion (Blum, 2023)
- ▶ MLB affiliates have developmental, minor league teams across four main levels
  - 2022, about 5,000 players across 165 teams



Source: Marquee Sports Network

# Minor League Baseball Player Acquisition

- ▶ MLB affiliates acquire players to their minor league teams by:
  1. Drafting players in the annual MLB draft (for domestic players)
    - ▶ Eligibility: HS graduate, 1 year after junior college, or turning 21 or 3 years at a 4-year university
  2. Signing players through free agency (for international players)
    - ▶ Eligibility: > 16 years old
- ▶ Average (median) signing bonus in 2022 MLB draft just over \$500,000 (\$130,000) [Bonus Plot](#)

# Minor League Baseball Labor Market

- ▶ Labor market features significant bargaining power for MLB affiliates and established, MLB players
- ▶ Until 2022, minor league baseball players made between \$5,000-\$15,000 annually
  - Save America's Pastime Act in 2018 exempted minor league players from minimum wage laws and overtime pay
- ▶ Large tournament incentives: Average MLB player earned \$4.2 million in 2022
  - Only 10 percent of minor league baseball players ever make it to the MLB
- ▶ Large idiosyncratic risk: MLB? Earnings?
  - 1st round player: 65% chance of making the MLB; \$20.28 million expected career earnings
  - 5th round player: 31% chance of making the MLB; \$3.46 million expected career earnings

# Private Labor Insurance: Income Pooling Agreements

- ▶ Private labor market insurance offered to minor league players in 2017
- ▶ Income pooling: Players agree to pay a portion of their future income beyond a hurdle rate into a common pool shared among other players
  - Exchange ≈ 15% of salary beyond 3 years' MLB earnings with other players in your pool
  - Free origination but the company takes 10 percent of pool contributions
  - Provide "labor" insurance through mechanism of reduced pay-performance sensitivity
- ▶ Two-step process:
  1. "Platforming": Players express formal interest in joining an income pool
    - ▶ Company facilitates matching process and offers potential pooling partners
  2. "Pooling": Players join an existing pool or enter a new pool with other players

Introduction  
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Baseball  
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Pooling  
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Selection  
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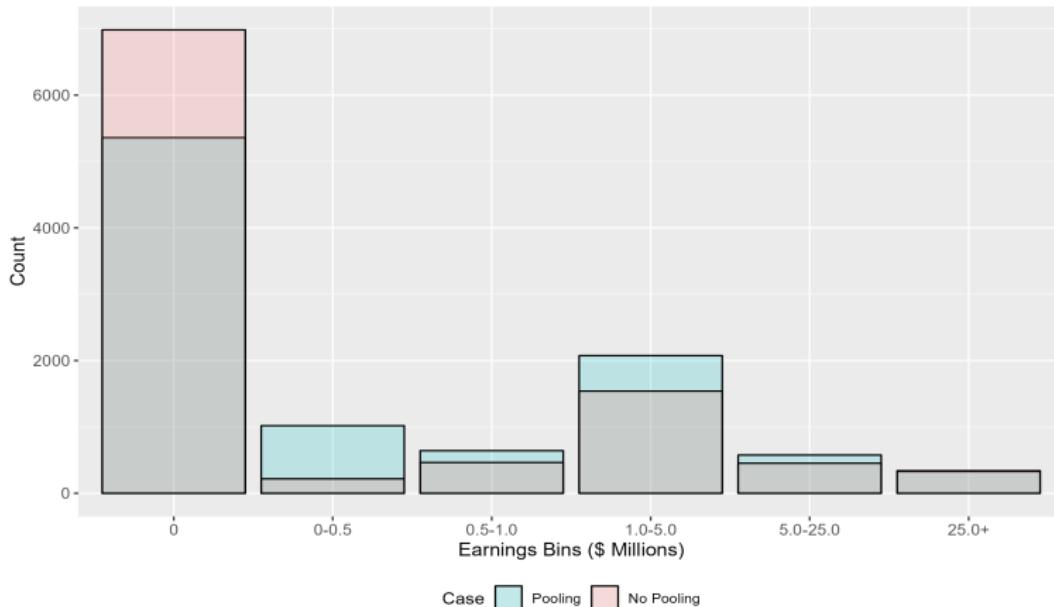
Identification  
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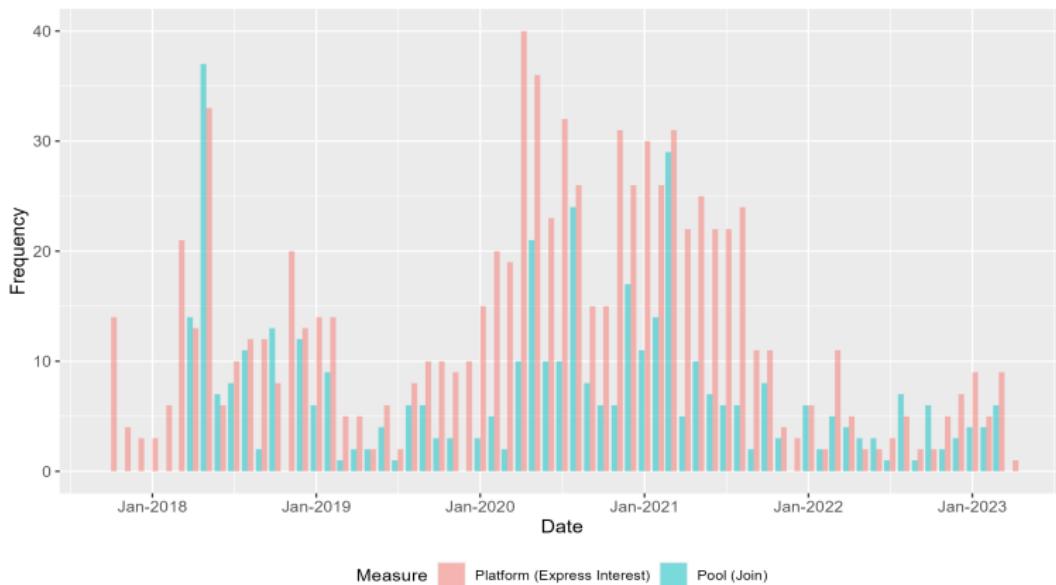
Conclusion  
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References

# Pooling Versus Non-Pooling Distribution



# Income Pooling Frequency



- ▶ 864 players “platform” (5%) and 425 players “pool” (2.5%) from 2017-2023

Timing

Pool Size

Platform Conversion

# Selection Differences: Platformers vs Population

Regression

	Platformers (N = 864)	Non-Platformers (N = 18,174)	Diff.
	Mean	Mean	Mean
Panel A: Player Characteristics			
<b>Demographics</b>			
Entry Age	19.23	19.75	-0.52***
US Origin	0.40	0.48	-0.08***
<b>Draft Characteristics</b>			
Round Number	19.33	15.41	3.92***
Bonus (\$100,000)	2.09	5.56	-3.46***
Drafted College	0.88	0.70	0.17***
Panel B: Playing Characteristics			
<b>Hitting Statistics</b>			
Average OPS	0.70	0.66	0.04***
Average PA	203.18	185.76	17.43***
<b>Pitching Statistics</b>			
Average ERA	4.02	5.04	-1.02***
Average IP	40.97	37.19	3.79***
Panel C: Platforming Characteristics			
Time to Platform	2.42	-	-

# Selection Differences: Poolers vs Platformers

Regression

	Poolers (N = 425)	Platformers (N = 439)	Difference
	Mean	Mean	Mean
Panel A: Player Characteristics			
<b>Demographics</b>			
Entry Age	19.19	19.27	-0.09
US Origin	0.38	0.42	-0.04
<b>Draft Characteristics</b>			
Round Number	21.23	17.65	3.58**
Bonus (\$100,000)	1.36	2.63	-1.27*
Drafted College	0.92	0.84	0.07*
Panel B: Playing Characteristics			
<b>Hitting Statistics</b>			
Average OPS	0.70	0.70	-0.00
Average PA	190.03	215.95	-25.92**
<b>Pitching Statistics</b>			
Average ERA	3.90	4.15	-0.25
Average IP	40.11	41.83	-1.72
Panel C: Platforming Characteristics			
Time to Platform	2.42	3.06	-0.64***

# Productivity Changes Following Pooling?

- ▶ Ambiguous effects of income pooling on performance
- ▶ Positive Effect:
  1. Reducing player stress
  2. Increasing information sharing and collaboration
  3. Allowing a form of collateral for further investment (Ghosh & Vats, 2022)
- ▶ Negative Effect:
  1. Free-riding incentives stemming from reduced pay-for-performance sensitivity (Andreoni, 1988)
- ▶ Related paper: Lusher *et al.* (2022) document a 2 percent decrease in cashier productivity for an 18-week increase in unemployment insurance potential benefit duration

# OLS Estimator

1. Begin with a design comparing changes in productivity for players post-pooling to control group

$$\text{Performance}_{i,j,k,m,y} = \beta_0 + \beta_1 \text{Treat}_i \times \text{Post}_{m,y} + \mathbf{X}_{i,j,k,y} + \gamma_i + \delta_{m,y} + \tau_{j,m} + \rho_k + \epsilon_{i,j,k,m,y} \quad (1)$$

- i: player, j: level, k: MLB affiliate, m: month, y: year
2. Causal estimate: If treatment timing is uncorrelated with time-varying, private information
    - Ambiguous if OLS estimate is positively or negatively biased due to pooling contract design
  3. Regression results display productivity measures consisting of playing time, playing efficiency, promotion, and injury

# Changes in Productivity Hitters

Panel A: Hitter Monthly Performance

	Output		Efficiency		Margin	
	PA	R	BA	OPS	Promote?	Injury
	(1)	(2)	(3)	(4)	(5)	(6)
Post × Pool	-3.55** [1.68]	-0.64** [0.28]	-0.01 [0.00]	-0.01 [0.01]	0.00 [0.01]	-0.00 [0.01]
Observations	118021	118021	117912	117845	118021	118021
R <sup>2</sup>	0.58	0.45	0.18	0.19	0.17	0.11
Y-Mean	59.35	7.27	0.24	0.68	0.07	0.05
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

- ▶ Five percent decline in playing time leading to declines in output
- ▶ Minor decline in hitting efficiency and limited change in level or injury

T-Statistics

Coefficient Magnitude

## Changes in Productivity Pitchers

Panel B: Pitcher Monthly Performance

	Output		Efficiency		Margin	
	IP	K's	ERA	K/BB	Promote?	Injury
	(1)	(2)	(3)	(4)	(5)	(6)
Post × Pool	-0.60 [0.39]	-0.79** [0.38]	-0.04 [0.17]	-0.20* [0.10]	0.00 [0.01]	0.00 [0.01]
Observations	126275	126275	126092	116770	126275	126275
R <sup>2</sup>	0.51	0.44	0.16	0.25	0.18	0.11
Y-Mean	12.05	11.64	4.28	2.84	0.08	0.05
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

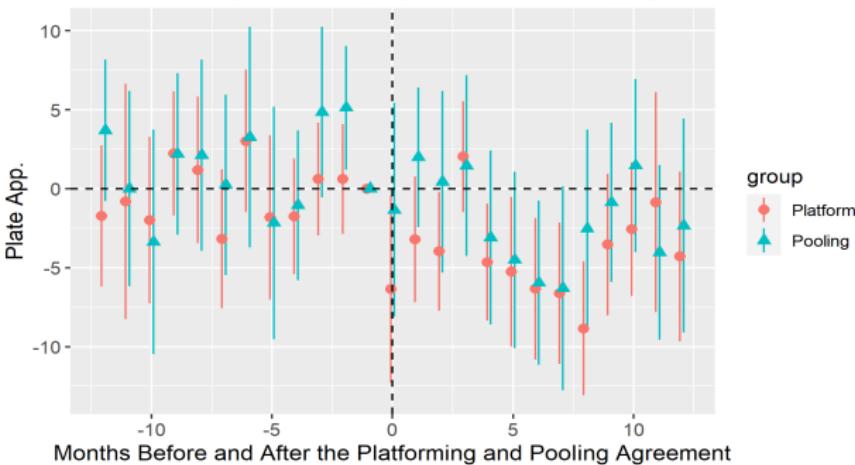
- Significant decline in output and pitching efficiency with no change in level or injury

T-Statistics

Coefficient Magnitude

# Violation of Random Adoption Timing

Effect of Platforming and Pooling Agreement on Plate App. [-12+, 12+]



- ▶ Players more likely to platform when experiencing a decline in playing time or injury in the prior month [Regression Table](#)

## Empirical Strategy

- ▶ Ideal experiment: randomly assign individuals into income pooling groups or provide random exposure to individuals
- ▶ My design: Use quasi-random exposure to pooling for a focal player based on his peers' platforming decision
- ▶ Use two separate instruments based on lagged proportion of platformed peers from:
  1. Focal player's birth location
  2. Focal player's Major League Affiliate

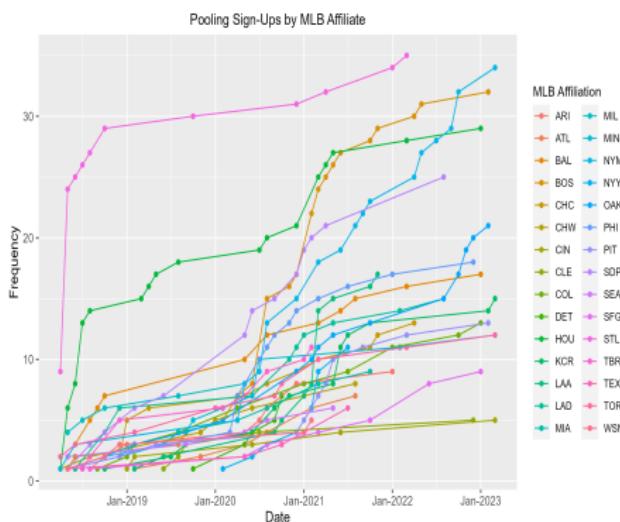
### First-Stage

$$Treat_i \times Post_{m,y} = \alpha_2 + \beta_2 Instrument_{i,(m,y)-1} + \mathbf{X}_{i,j,k,y} + \gamma_i + \delta_{m,y} + \tau_{j,m} + \rho_k + \epsilon_{i,j,k,m,y} \quad (2)$$

### Second-Stage

$$Performance_{i,j,k,m,y} = \alpha_3 + \beta_3 \widehat{Treat_i \times Post_{m,y}} + \mathbf{X}_{i,j,k,y} + \gamma_i + \delta_{m,y} + \tau_{j,m} + \rho_k + \epsilon_{i,j,k,m,y} \quad (3)$$

# Instrument Relevance



- ▶ First stage F-statistic  $\approx 25\text{-}40$  in full sample;  $\approx 15\text{-}25$  in position groups
  - Regression Table
- ▶ Institutional details provide support for independence assumption

## Exclusion Restriction

- ▶ Focal player's lagged peers' decisions can impact his performance only through shifting his decision to pool



- ▶ I provide evidence in support of the exclusion restriction based on:
  - Placebo tests on individuals exposed to peers' decisions but not targeted by income pooling

# Placebo Test in Support of Exclusion Restriction

- ▶ Include only current MLB players who are not targeted by the income pooling company but still exposed to the time-varying shocks

Panel A: Hitter Monthly Performance								
	Instrument	Quartile	Output		Efficiency		Margin	
			PA	R	BA	OPS	Promote?	Injury
Location		-0.03 [0.47]	0.04 [0.09]	0.00 [0.00]	0.00 [0.00]	0.00 [0.00]	0.00 [0.00]	0.00 [0.00]
Observations		4927	4927	4908	4908	4917	4927	
$R^2$		0.43	0.40	0.27	0.25	0.25	0.17	
Fixed Effects		Yes	Yes	Yes	Yes	Yes	Yes	
Y-Mean		86.91	11.10	0.39	0.71	0.22	0.11	
Y-SD		29.74	5.43	0.13	0.18	0.41	0.32	

# Effect of Pooling on Performance: Peer Location IV

Combined Panel: IV Hitter and Pitcher Monthly Performance										
	Hitter				Pitchers					
	Output		Efficiency		Output		Efficiency			
	PA	R	BA	OPS	IP	K's	ERA	K/BB		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		
Post × Pool	-45.82*	-8.03*	-0.08*	-0.16	-12.87**	-10.76**	1.91*	-1.90**	[26.71] [4.05] [0.04] [0.12] [4.99] [4.87] [1.11] [0.83]	
Observations	118066	118066	117889	117889	126194	126194	126011	116697		
Instrument Loc.	Loc.	Loc.	Loc.	Loc.	Loc.	Loc.	Loc.	Loc.		
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
F-Statistic	22.94	22.94	22.84	22.84	29.35	29.35	29.29	27.81		
Y-Mean	59.35	7.27	0.24	0.68	12.05	11.64	4.28	2.84		
Y-SD	33.88	5.22	0.08	0.20	7.55	7.31	3.26	1.98		

- Decline in playing time, output, and efficiency for both hitters and pitchers
- Local average treatment effect (LATE): Estimate causal for players **complying** with locational peers' platforming decisions

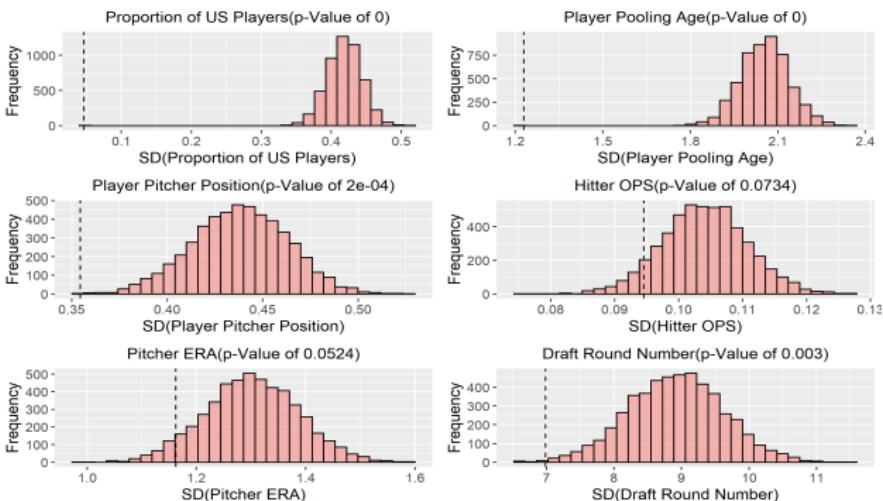
# Effect of Pooling on Performance: Peer Teammate IV

Combined Panel: IV Hitter and Pitcher Monthly Performance								
	Hitter				Pitchers			
	Output		Efficiency		Output		Efficiency	
	PA	R	BA	OPS	IP	K's	ERA	Promote?
	(1)	(3)	(4)	(6)	(2)	(5)	(8)	(7)
Post × Pool	-0.82 [20.77]	3.81 [4.65]	0.07 [0.06]	0.24 [0.18]	2.68 [3.92]	-2.23 [3.86]	2.73 [1.90]	-1.38 [1.13]
Observations	118066	118066	117889	118066	126194	126194	126011	116697
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Instrument	Aff.	Aff.	Aff.	Aff.	Aff.	Aff.	Aff.	Aff.
F-Statistic	12.50	12.50	12.54	12.50	20.12	20.12	20.17	20.12
Y-Mean	59.35	7.27	0.24	0.68	12.05	11.64	4.28	2.84
Y-SD	33.88	5.22	0.08	0.20	7.55	7.31	3.26	1.98

1. Monitoring Channel: Limited changes in player performance when induced to pool with teammates Mechanism
2. Local average treatment effect (LATE): Estimate causal for players complying with Major League Affiliate peers' platforming decisions

# Pooling Partner Choice to Mitigate Risk?

- ▶ How do players attempt to mitigate potential pooling frictions stemming from asymmetric information and cash flow based risk?
- ▶ **Pooling Homogeneity:** Results suggest that players choose others with similar characteristics, performance measures, and expected cash flows to mitigate cash-flow based risk
  - Results from a counterfactual, empirically bootstrapped distribution



# Conclusion

1. Selection into private insurance contracts correlated with an individual's level of downside protection and sophistication
2. Individuals are significantly more likely to be injured before signing up
  - Lower time-invariant ability level
3. Performance declines for individuals after signing up
  - Declines offset when contracting with closer peers
4. Players' insurance pools are largely homogeneous
  - Players contract with others of similar ability, backgrounds, and occupations to mitigate information asymmetries

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## Lifetime Earnings Growth

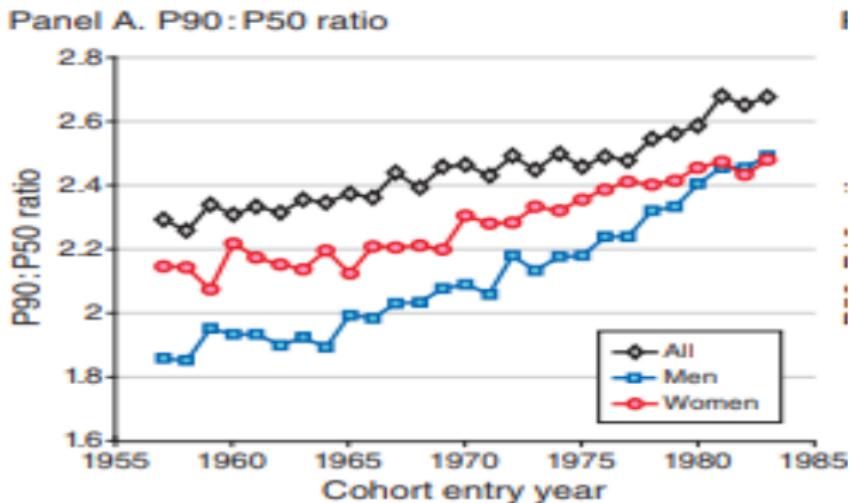
(A) Lifetime Earnings Growth,  $\log(\bar{Y}_{55}) - \log(\bar{Y}_{25})$



Source: Guvenen *et al.* (2021)



## Increasing Earnings Inequality



Source: Guvenen *et al.* (2022)



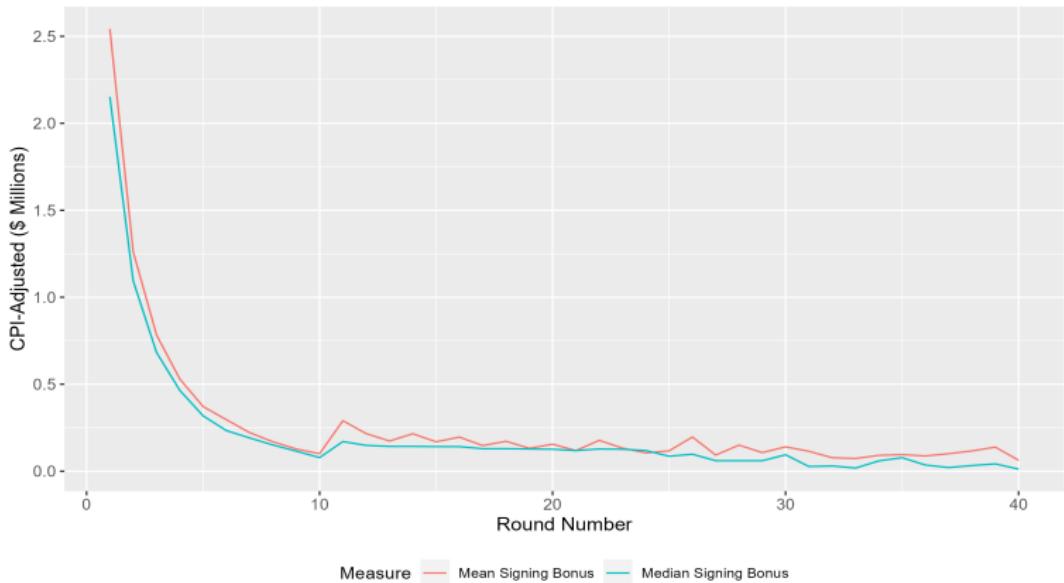
## MLB Map



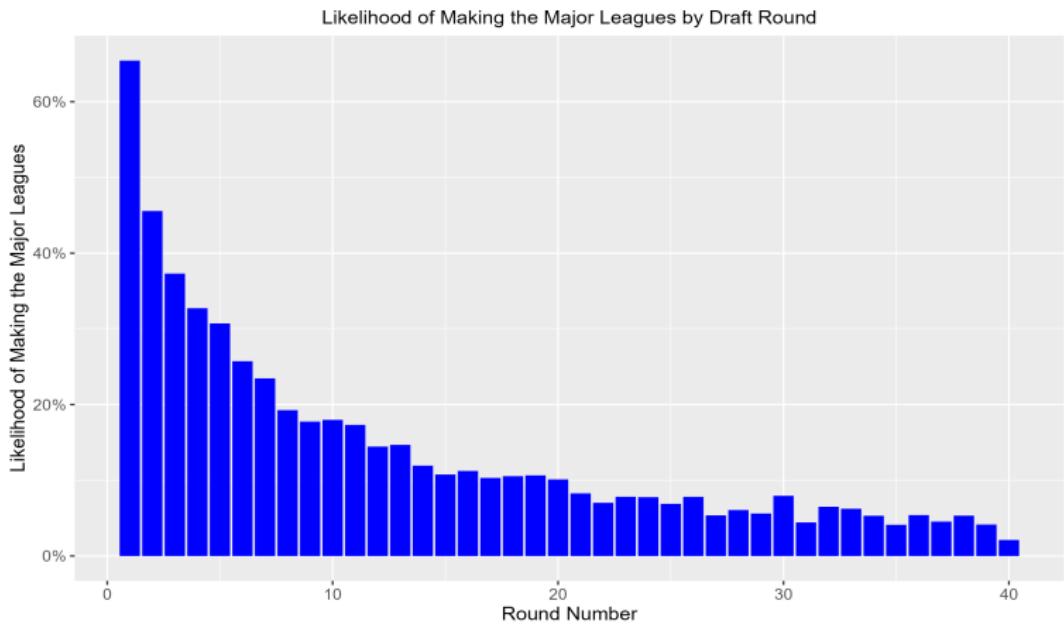
Source: <https://sportleaguemaps.com/baseball/mlb/>



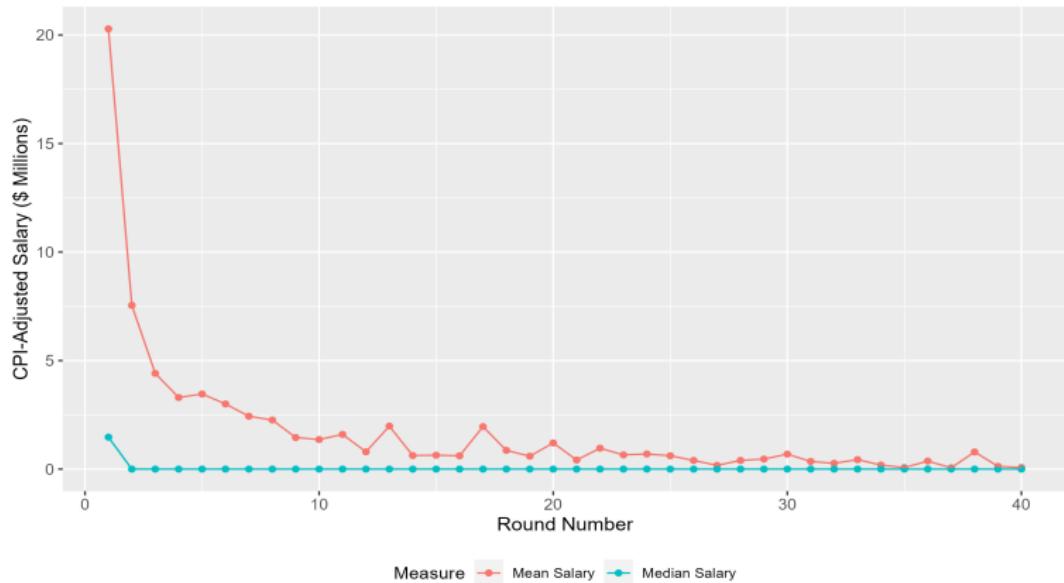
## MLB Draft Signing Bonus by Round



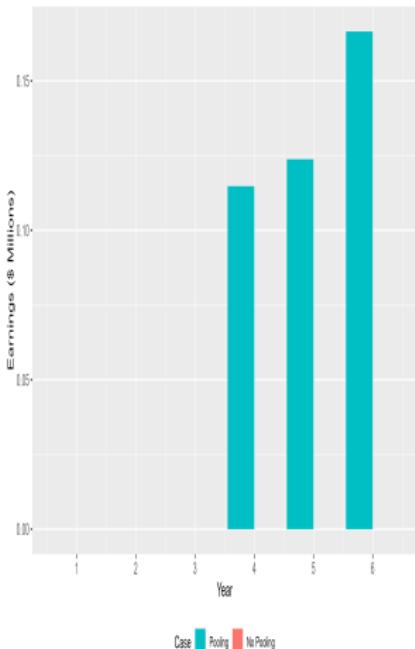
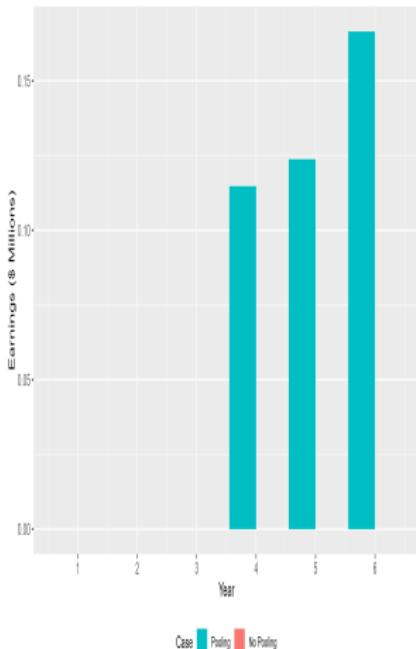
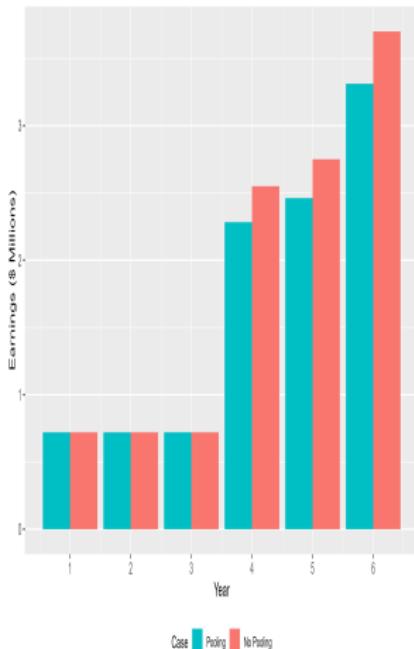
# MLB Likelihood by Draft Round



# Expected Career Earnings by Draft Round



# Pooling Process Example

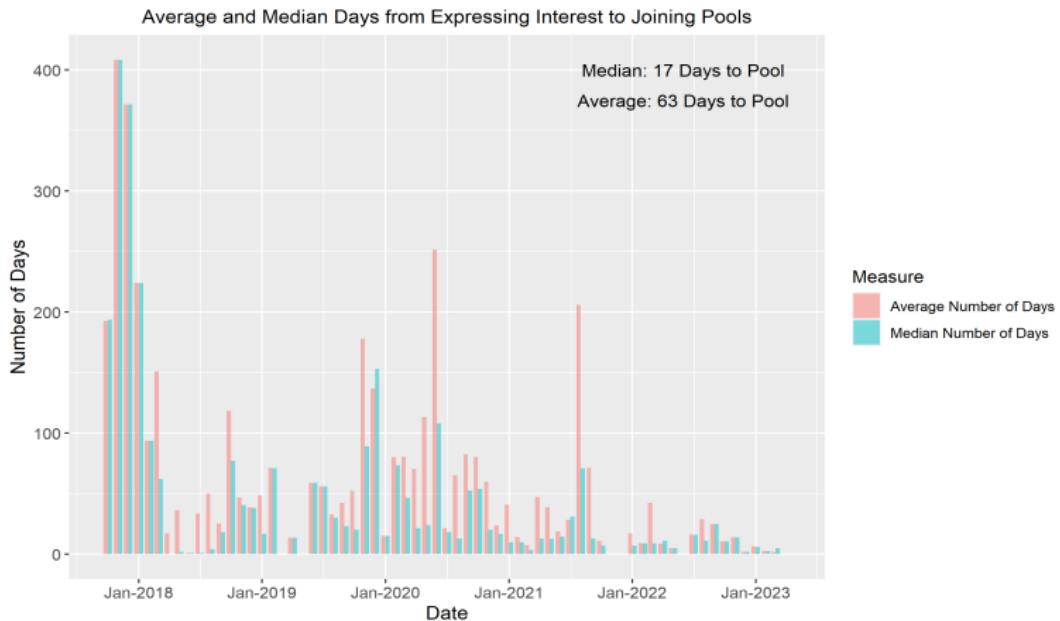


Case Pooling  
No Pooling

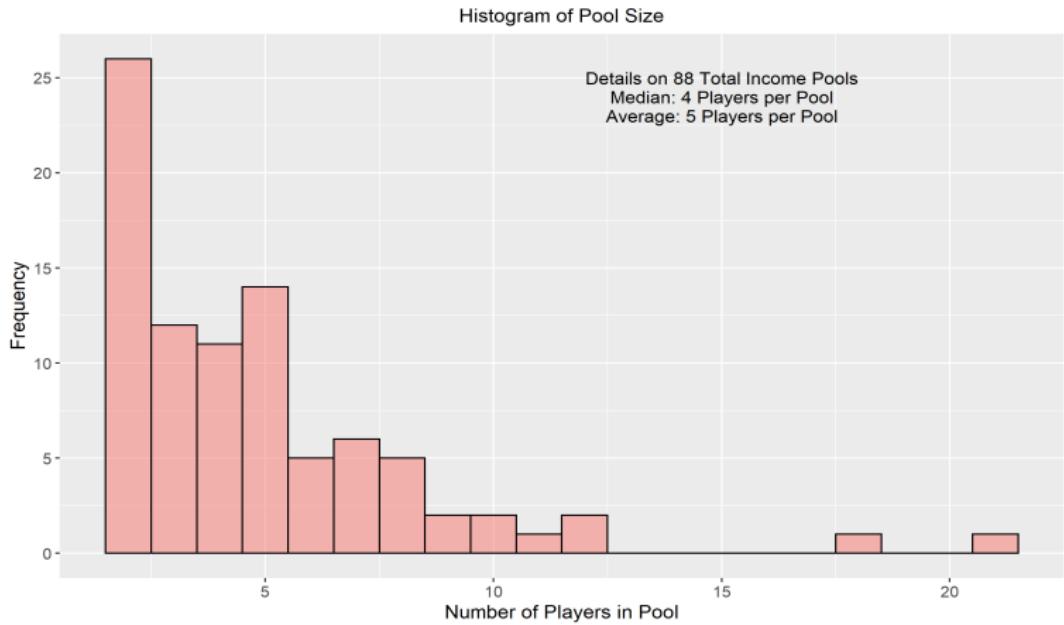
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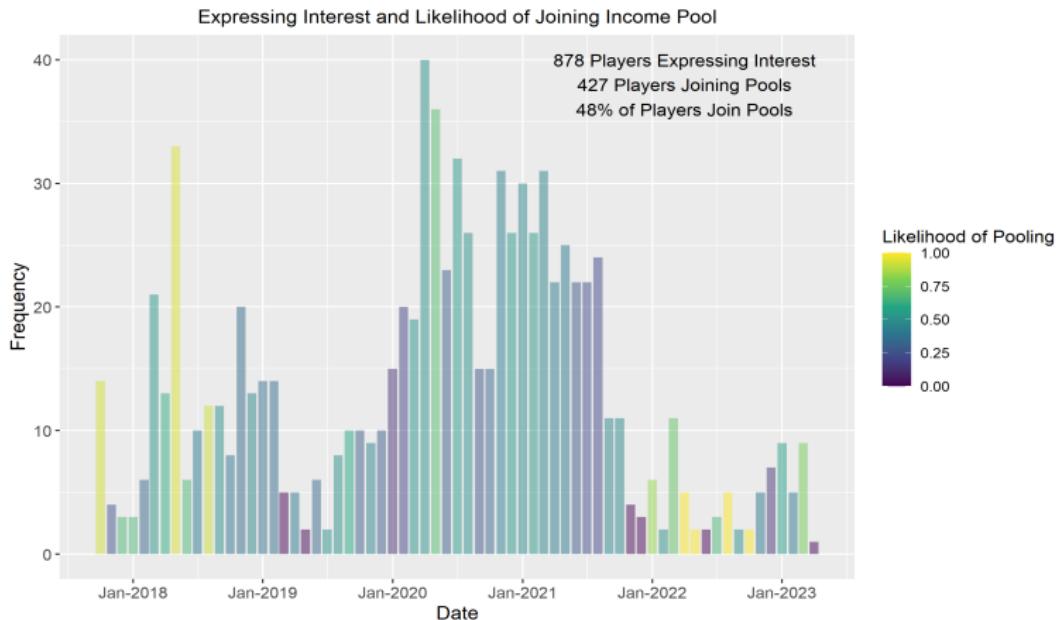
# Time from Platforming to Pooling



# Income Pool Size Distribution



# Platforming to Pooling Conversion Rate



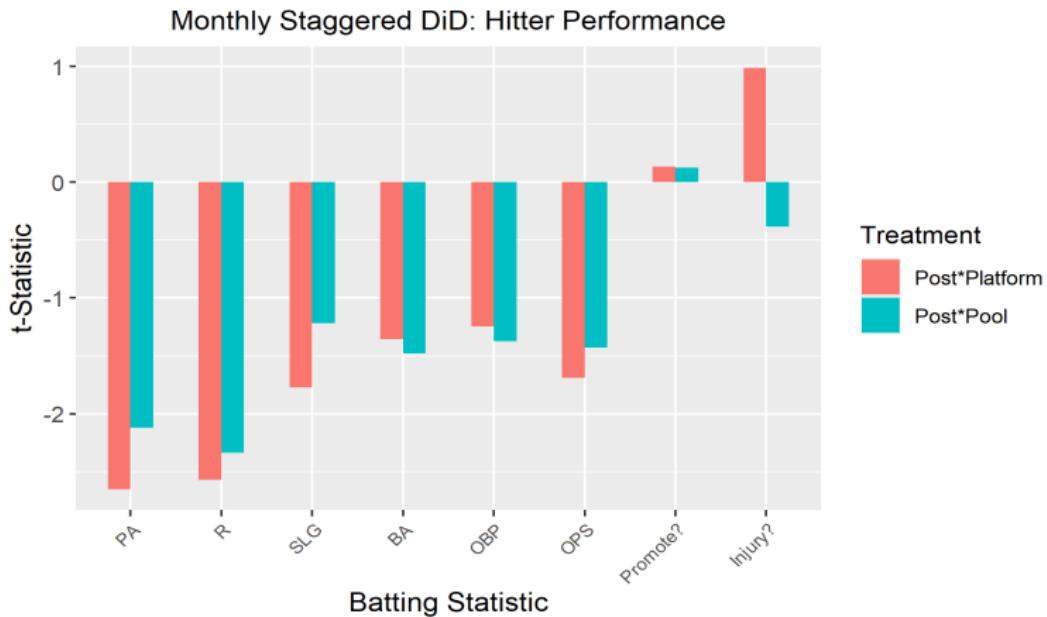
# Selection Differences Platforming

Sample	Platform?			Pool?		
	All	Hitters	Pitchers	All	Hitters	Pitchers
	(1)	(2)	(3)	(4)	(5)	(6)
Round Number	0.04 [0.03]	0.10* [0.05]	0.06 [0.04]	0.05** [0.02]	0.09** [0.04]	0.04* [0.02]
Bonus	-0.12*** [0.03]	-0.18*** [0.05]	-0.16*** [0.04]	-0.05*** [0.01]	-0.06** [0.02]	-0.08*** [0.01]
Drafted College	2.53** [0.96]	-0.37 [2.44]	1.93 [1.08]	1.10* [0.59]	0.50 [1.58]	0.95 [0.78]
Pitcher	-0.50*** [0.14]			-0.24 [0.21]		
Average OPS		14.23*** [3.51]			7.22** [2.92]	
Average PA		0.07* [0.03]			0.02 [0.02]	
Average ERA			-0.35** [0.14]			-0.25** [0.08]
Average IP			0.37*** [0.09]			0.19*** [0.06]
Observations	18929	8563	10351	18929	8563	10351
R <sup>2</sup>	0.05	0.09	0.06	0.04	0.05	0.05
Affiliation F.E.	Yes	Yes	Yes	Yes	Yes	Yes
First Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Y-Mean	4.54	4.81	4.31	2.23	2.36	2.14
Y-SD	20.81	21.40	20.31	14.78	15.18	14.46

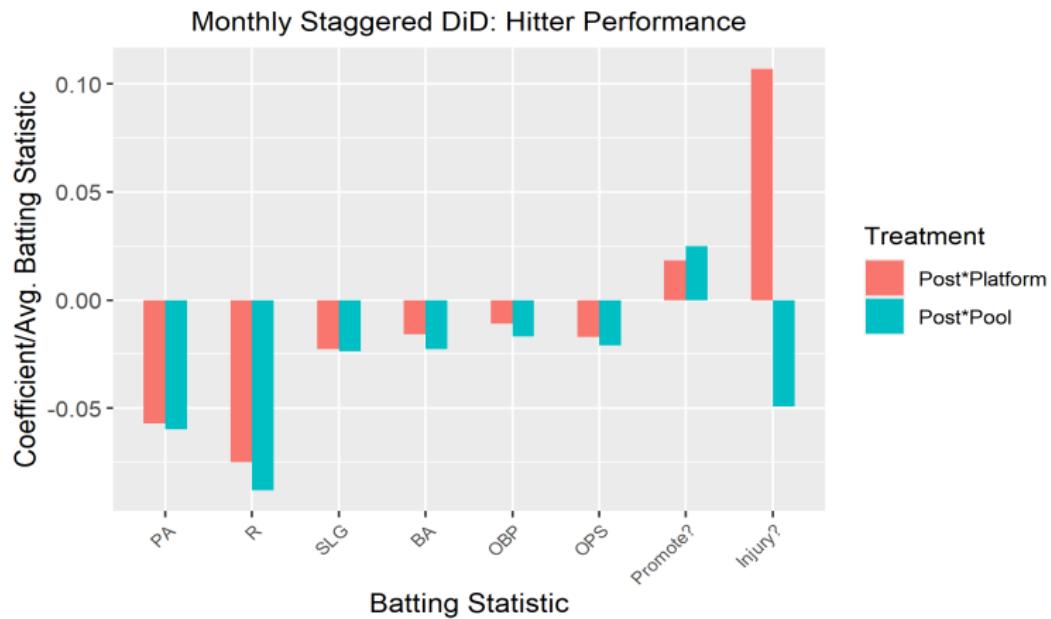
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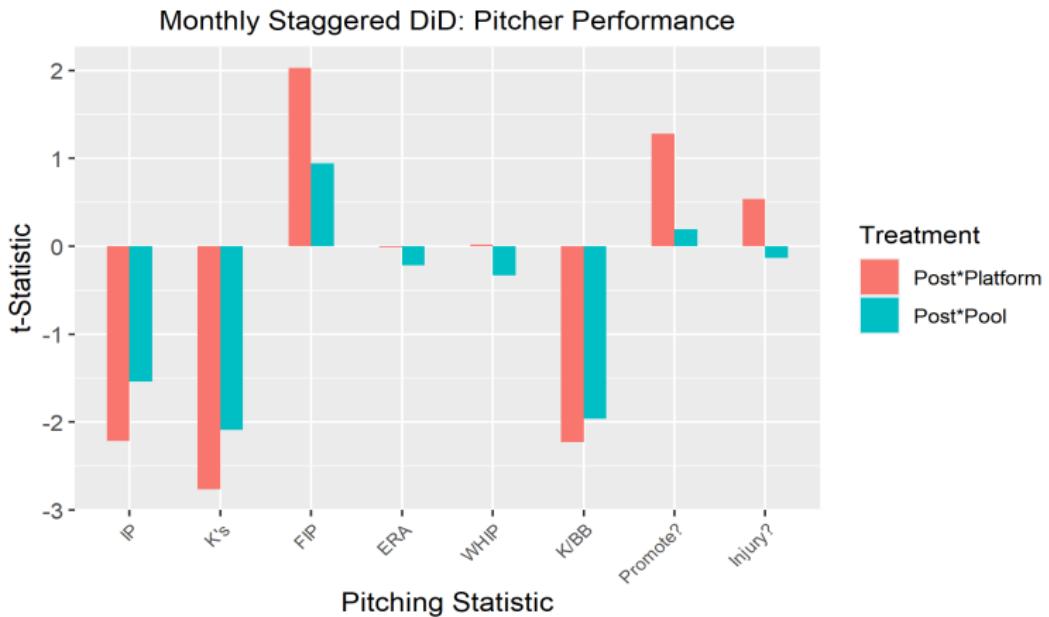
# Hitter Performance T-Statistics



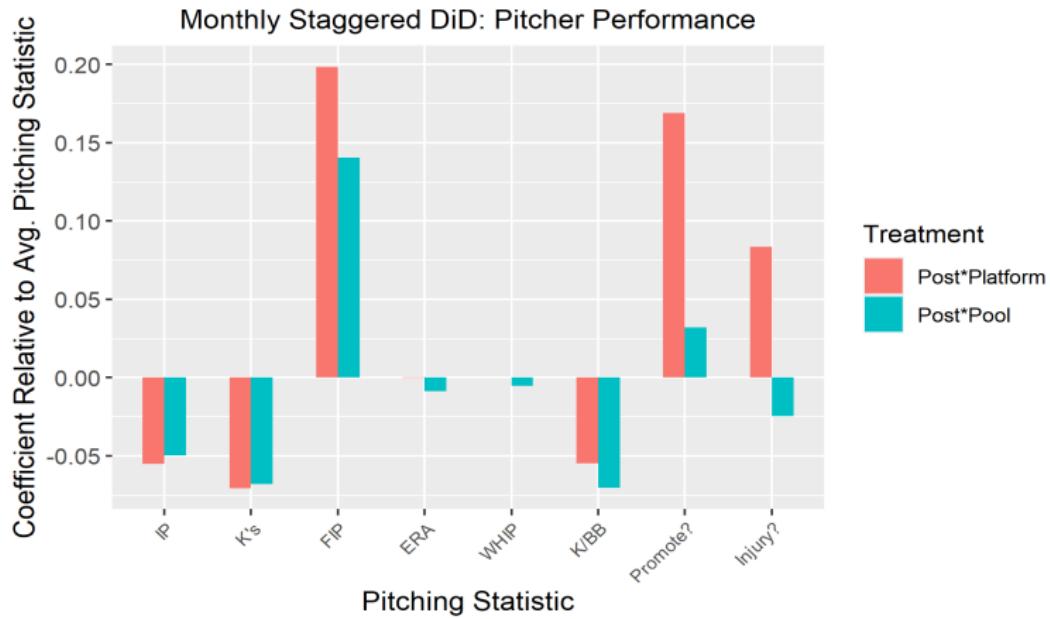
# Hitter Performance T-Statistics



# Pitcher Performance T-Statistics



# Pitcher Performance T-Statistics



# Platforming Timing Adoption

	Platform?							
	Hitters				Pitchers			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PA <sub>t-1</sub>	-0.00** [0.00]							
On-Base % Plus Slugging <sub>t-1</sub>		-0.21 [0.22]						
Promotion <sub>t-1</sub>			0.03 [0.16]				0.18 [0.13]	
Injury <sub>t-1</sub>				0.11 [0.13]				0.36*** [0.13]
Inning Pitched <sub>t-1</sub>					-0.01 [0.01]			
ERA <sub>t-1</sub>						0.01 [0.01]		
Observations	109384	109243	109391	109391	115733	115610	115943	115943
R <sup>2</sup>	0.63	0.63	0.63	0.63	0.65	0.65	0.65	0.65
Fixed Effects F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Y-Mean	2.32	2.32	2.32	2.32	2.25	2.25	2.25	2.25
Y-SD	15.05	15.05	15.05	15.05	14.83	14.83	14.84	14.84
X1-Mean	61.17	0.68	0.08	0.05	12.46	4.17	0.09	0.05
X1-SD	33.59	0.19	0.27	0.22	7.52	3.09	0.29	0.21

# Instrument Relevance?

	Post Platform?				Post Pool?			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Platform Location Instrument <sub>t-1</sub>	1.14*** [0.15]	1.21*** [0.16]			0.56*** [0.09]	0.59*** [0.10]		
US Origin <sub>i</sub> × Platform Location Instrument <sub>t-1</sub>		-0.26* [0.15]				-0.13 [0.09]		
Platform Affiliation Instrument <sub>t-1</sub>			0.73*** [0.19]	1.15*** [0.22]			0.57*** [0.12]	0.81*** [0.15]
US Origin <sub>i</sub> × Platform Affiliation Instrument <sub>t-1</sub>					-0.78*** [0.14]			-0.46*** [0.11]
Observations	247327	247208	247327	247208	247327	247208	247327	247208
R <sup>2</sup>	0.61	0.62	0.61	0.61	0.60	0.60	0.59	0.59
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Y-Mean	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01
Y-SD	0.14	0.14	0.14	0.14	0.10	0.10	0.10	0.10
Instrument Mean	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Instrument SD	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
F-Statistic	57.53		14.44		39.33		22.65	

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## IV Mechanism

	Excess Affiliation Percent (Max Aff. % - Naive Aff. %)	
	Placebo (1)	Real (2)
Platform Location Instrument	0.12 [0.41]	
Platform Affiliation Instrument		1.54** [0.73]
Observations	406	406
R <sup>2</sup>	0.35	0.36
Month × Year F.E.	Yes	Yes
Location F.E.	Yes	Yes
Y-Mean	0.27	0.27
Y-SD	0.30	0.30

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- ▶ Players induced to pool by exposure to their teammates' platforming decisions are significantly more likely to pool with their Major League Affiliate teammates